

Chairman's Award - Team 1923

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2022 - Team 1923

Team Number

1923

Team Nickname

The MidKnight Inventors

Team Location

Plainsboro, New Jersey - USA

Describe the impact of the *FIRST* program on team participants within the last 3 years. This can include but is not limited to percentages of those graduating high school, attending college, in STEM careers, and in *FIRST* programs as mentors/sponsors.

FRC 1923 creates an environment where all students are able to grow both in their STEM skills as well as in their leadership. Inventors are exposed to career opportunities, scholarships and internships through our sponsor and mentor networks. The MidKnight Inventors have become a core of the school district's activities; 1 out of every 16 high school students are involved with our FRC program. The national average of committed STEM majors is 20%; for The MidKnight Inventors alumni it is 100%.

Describe your community along with how your team addresses its unique opportunities and circumstances.

Our team is large, and based in a well-developed area. We believe we can use the resources and privilege we have to help our community grow and inspire change in the world. New Jersey is home to hundreds of thousands of marginalized youth who need a spark to ignite a passion for STEM. The MidKnight Inventors strive to serve those youth by partnering with local organizations like NJ RISE. We collected and donated books and STEM Kits to provide additional opportunities for local students.

Describe the team's methods, with emphasis on the past 3 years, for spreading the *FIRST* message in ways that are effective, scalable, sustainable, and creative. How does your team measure results?

RoboExpo and our other community events reach over 300 K-12 students to age-appropriate *FIRST* programs each year. MidKnight Inventor students embody the *FIRST* spirit; spending over 1600 hours mentoring and assisting 43 FLL, 2 FTC, and 3 FRC teams this season alone. To accommodate growing interest in our FRC team, we developed "Project Gemini", expanding The MidKnight Inventors into 2 twin-robot teams. By doing so, we increase student accessibility to *FIRST* experiences in our 172-student program.

Please provide specific examples of how your team members act as role models within the *FIRST* community with emphasis on the past 3 years.

Our team members create Outreach Manuals, Business Plans, and technical training materials as a reference for the *FIRST* community, which have been downloaded over 3700 times. 1923 maintains a presence on Discord and social media to share information and answer questions across the *FIRST* community. We presented at Compass Alliance workshops on Outreach and Mechanical Design. As our team grows, we pass our knowledge to the *FIRST* community - uplifting programs beyond our own.

Describe your team's initiatives to Assist, Mentor, and/or Start other *FIRST* teams with emphasis on activities within the past 3 years.

Each year, we seek to strengthen our 13-year pipeline of teams at all FIRST program levels. In the past 3 years, we started 33 FLL teams, and maintained our mentoring relationship with an existing 48 FLL, 2 FTC and 3 FRC teams. This year, we began mentoring rookie FRC team 8714, providing them equipment and technical expertise. We also share best-practices online, assisting hundreds of other FIRST teams, and frequently use our shop resources to manufacture parts for local teams in need.

Beyond starting teams, what initiatives have you done to help inspire young people to be science and technology leaders and innovators? What results have you seen from your efforts in the past 3 years?

We conduct STEMGirls workshops both virtually and in-person, giving over 900 children the opportunity to explore hands-on STEM activities & listen to speakers from various STEM backgrounds. For the 2020-21 school year, we added a Robotics Engineering course based on the FIRST experience to our 5 existing STEM courses designed by The MidKnight Inventors in collaboration with our school district. This course provides high-quality technology education to an additional 145 students each year.

Describe the partnerships you've created with other organizations (teams, sponsors, educational institutions, philanthropic entities, etc.) and what you have accomplished together with emphasis on the past 3 years

Our team sustains a 4 year relationship with the Embrace Kids Foundation, sharing FIRST with children facing illnesses at Robert Wood Johnson Hospital. We received FIRST's Equity and Access Grant to create STEM Kits for the hospital so that we could continue our workshops virtually from 2020 onward. Our school district, a longtime partner, provides lab space and transportation for team members, and works with us to design curricula, bringing the FIRST experience to more students.

Describe your team's efforts in the past 3 years to promote equity, diversity, and inclusion within your team, *FIRST*, and your communities.

We focus on bringing FIRST to underserved youth in our community. Through the MKI Global Initiative, we reached 700+ underprivileged girls in rural India & China who lacked access to STEM, and have a planned 2022 expansion. Our leads completed FIRST's Equity, Diversity & Inclusion Training to ensure that our 172 members feel welcome. By mentoring and assisting 45+ other FIRST program teams, we enable students with varying levels of access to receive similar opportunities as students on 1923.

Explain how you ensure your team and the initiatives you have created will continue to run effectively for the foreseeable future

Our 5-year growth plan outlines our strengths, weaknesses, threats and opportunities. We allocate our budget for sustainability of mentorship programs, event hosting, equipment investments and team support. Sustaining a network of K-12 FIRST teams ensures the MidKnight Family will have strong roots for generations of students to come. To keep historical knowledge within the team for future Inventors, our leadership hosts workshops emphasizing both hard and soft skills in the summer and fall.

Describe your team's innovative strategies to recruit, retain, and engage your sponsors within the past 3 years

Each year, our MidKnight Family distributes a comprehensive sponsorship packet and our business team applies for grants from corporations and local businesses. We reward sponsors with tiered benefits and share a biweekly update newsletter with all supporters. This year, of our 18 sponsors, 9 of our largest donors are sustained and returning partners. Our social media highlights sponsors and provides them with updates on our expansive work!

Highlight one area in which your team needs to improve and describe the steps actively being taken to make those improvements.

With 172 members this year, it can be hard to ensure equal involvement, active participation, and opportunities for all. In response, our team introduced "Project Gemini", a new dual-robot program that provides more competition roles, allowing members to get the most out of FIRST. The student knowledge-base is maintained year over year by a network of alumni mentors, as well as leader-created workshops that seek to provide pre-season experience for all new Inventors.

Describe your team's goals to fulfill the mission of *FIRST* and the progress you have made towards those goals.

The MidKnight Inventors carry out FIRST's mission to spark interest in young people to become leaders and innovators in STEM. Through workshops, summer camps, and FIRST events, we create opportunities for over 1000 students each year to explore their passion for robotics. Our team's K-12 FIRST mentorship cycle enables students to grow from FLL into FRC, fostering teamwork and collaboration skills to help students at all program levels succeed.

Briefly describe other matters of interest to the *FIRST* Judges, including items that may not fit into the above topics. The judges are interested in learning about aspects of your team that may be unique or particularly noteworthy.

Team 1923 is the largest cross-district program in WWP. We fully embrace our motto, "two schools, one team," and work closely with the district to form new STEM curricula and successfully advocate for updated tech classrooms. Promoting

FIRST locally and globally, the MidKnight Family takes root in our STEM programs in NJ, as well as India and China. As our program reaches new heights, we continue to model Gracious Professionalism and Co-opertition through our long-standing team initiatives.

Essay

"Progress is impossible without change." - George Bernard Shaw

In 2005, 4 students with a broom closet for a workspace came together to start Team 1923. 17 seasons later, we have gone through generations of changes, but remain constant in our goal to create meaningful impact in our community. Making STEM accessible is the core of what it means to be a MidKnight Inventor.

FIRST is a Vehicle for Change in our School

The MidKnight Inventors are the largest cross-district organization in all of West Windsor-Plainsboro; our impact reaches far beyond the robotics lab. Our school district has recognized our program as the foundation of its STEM expansions. After starting the team, our students and mentors advocated for support; we now have four staff Advisors, transportation provided to robotics meetings, and integration with the technology department curriculum. FIRST programs are now available to all WWP students, K-12 through our FRC team's efforts.

In the last 8 years, we have worked with WWP to design six STEM courses - and in 2020, helped design a new high school Robotics Engineering elective which mirrors the FRC experience. This Robotics class also opens up interest to our FRC team, helping us to grow our membership each season. As of 2022, 1 out of every 8 students are enrolled in an Engineering Department course, and we continue to expand the STEM offerings each school year.

With an expansion in coursework, we have also worked with our school district to design renovations to all technology classrooms to keep up with new course needs. In addition to a dedicated robotics lab at HS North, the robotics lab expansion at HS South opens later this year after COVID postponements. These spaces, designed by The MidKnight Inventors, help make FIRST experiences possible for even more WWP students.

Since 2017, the WWP Education Foundation has hosted the annual Innovation Fair, in which clubs and local STEAM groups have the opportunity to showcase their work. In collaboration with WWPEF, Team 1923 showcases FIRST programs and provides student interaction with the robot, giving 1500+ members of the community hands-on STEM experience each year, and planting the seeds for sustainable interest in robotics.

WWP families are invited each May to MidKnight RoboExpo. For the last 7 years, our team has organized this event, where dozens of district robotics teams from FLL Explore through to FRC showcase their robots. This connects prospective students and parents with FIRST, and allows them to easily find a team to join for the next school year. Beyond introducing our community to FIRST, RoboExpo provides a recruitment platform for students seeking team placement.

FIRST Enables Us to Change our Community

When 1923 was founded, established teams in our region made sure we had what we needed to help our team grow. As the MidKnight Family expands, we seek to continue to impact other FIRST teams in the same way we were supported. Our team develops resources and shares our expertise locally, as well as online, to strengthen FIRST programs.

Our MidKnightU video tutorials, produced and updated by student leaders each year, teach students the basics of FRC. All incoming team members take our MidKnightU classes as part of their first steps on the team. From there, they can dive deeper into a specific subteam through MKI Foundations; weekly workshops in the engineering lab teaching advanced topics ranging across technical and non-technical subteams. Established this year as a way for students to apply their new skills, MKI Foundations culminates in a Capstone project to demonstrate their knowledge. These two programs work hand-in-hand to bring new MidKnight Inventors up to speed. Other resources on how we manage our large program include our team's Handbook, Business Plan, and a 40-page Outreach Manual detailing how our team designs & scales community events, so that other FIRST teams can grow the way we have.

As a large, established team, we strive to make opportunities available for students in other FIRST programs. Our digital resources, including recordings of all MidKnightU and MKI Foundations coursework, have been shared on YouTube, Discord, Chief Delphi and team social media pages. To date, they have been downloaded and viewed by a global audience of over 17,000 people in 8 countries.

Since 2019, The MidKnight Inventors have hosted FIRST workshops dedicated to engaging young girls in robotics and STEAM subjects. Our interactive FIRST robotics workshops have grown to reach 300+ students annually in underrepresented communities. Last year, we added virtual options to engage more girls in STEM. The widespread positive response helped us expand to accommodate 7 workshops totaling over 700 volunteer hours, reaching participants in New Jersey, Maryland, Texas, and California.

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In 2021, we expanded to 12 additional workshops and panels, further engaging young women in technology, and empowering girls to be leaders in STEM fields. These new programs reached over 500 students, 288 from minority groups. We continue to hold these workshops annually with returning and new guest speakers and with new topics for students to continue to learn more about STEM.

Team 1923 met with 18 other FIRST Mid-Atlantic robotics teams in 2020 to conduct training seminars at Team 1403's Compass Alliance conference. During this event, we shared resource materials and presentations on Outreach and Mechanical Design to teams across New Jersey in order to provide guidance for teams seeking further program growth.

Expanding our MidKnight Family this year, we are mentoring rookie FRC team 8714. In the fall, we collaborated with them to build a robot so they could participate in the off-seasons, and they joined us for Kickoff - working side by side with us to analyze the 2022 competition to start off on the right foot. We continue to partner with 8714 through this season by providing parts, materials, & technical resources.

One of the many shifts our team has made since the onset of the pandemic is in hosting for our FLL qualifier. While we have hosted an event for 36 FLL teams each November since 2013, we adjusted to a virtual format in keeping with FIRST Mid-Atlantic's policies. Being able to maintain our reach within the FLL community and create a learning environment, foster healthy competition and initiate conversations to facilitate student growth has been an experience we are very grateful to be able to continue, even under challenging circumstances.

Our team also uses FRC events to gather the community together. Since 2013, we have hosted MidKnight Mayhem each June. With 36 teams from around the country, as well as dozens of local businesses and organizations from our community, we celebrate the end of the school year and demonstrate FIRST programs to over 1200 annual attendees. While we were unable to host this event in 2020 & 2021, we are hoping for a safe return to this event this summer.

To enrich STEM and FIRST experiences for families in our community, we partnered with NJ RISE, a local social support center, to collect STEM related toys & books for children of all ages. Our team used the FRC Kickoff as our first drive collection and donated over 80 items to the families of NJ RISE. We plan to maintain our relationship with them to help ignite and sustain interest for STEM for those who have limited access to these opportunities.

FIRST Allows us to Impact the World

Accessibility to STEM is important for students beyond our local community. Our MKI Global Initiative, a sustained program since 2015, reaches out to underserved populations in India, China and the Democratic Republic of the Congo with a FIRST-based curriculum of STEM workshops. In Anantapur, India we engaged over 900 students and 15 schools located in rural areas. We impacted 60+ students in Nanhai Academy in China by running FLL camps. In an effort to ensure MKI Global Initiative teams continue their access after our students fly home, we provide EV3 and WeDo kits alongside a curriculum they can implement and scale locally. While COVID has prevented us from traveling in the past few years, we maintain relationships with existing schools and constantly seek out new areas to create impact virtually. In 2022, we are collaborating with another student organization, Hands Across the Water, to create STEM kits & educational videos in an effort to restore the Community Charity School in the Congo.

Continuous Growth & Building a Second Family

Creating FIRST programs at all grade levels in our school district enables us to grow an FRC program with engaged, enthusiastic students. 47% of our current FRC students have experience on a FIRST team before joining the MidKnight Family. This year alone, our students have spent over 1600 hours mentoring and assisting 43 FLL, 2 FTC, and 3 FRC teams.

This year, in response to a 47-member increase in headcount for our FRC team, we implemented a new initiative called "Project Gemini," expanding The MidKnight Inventors into two twin-robot teams. In doing so, we aim to make core aspects of competition more accessible, increasing hands-on opportunities for students of all experience levels.

MidKnight Inventors grow into confident professionals and STEM enthusiasts, with 100% of the past three graduating classes of Inventors majoring in STEM. Supported by a network of alumni mentors and sustained sponsors, our program reaches 1 out of every 16 students in our high schools for the 2021-22 school year.

The progression from 4 team members to 172 is a sustained effort; in 17 years, The MidKnight Inventors have developed into a family that expands beyond the confines of our own school. Our efforts to change our team and community have established a program that enables us to spread FIRST within our school, state, and across the world - allowing others to experience the inspiration and passion for STEM created from FIRST programs.