

## FIRST Impact Award - Team 6421

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| <b>2025 - Team 6421</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Team Number</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>6421</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Team Nickname</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| WarriorBots                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Team Location</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Muskego, WI - USA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Describe the impact of the <i>FIRST</i> program on team participants within the last 3 years. Think about percentages of those graduating high school, attending college, in STEM careers, leadership skills, and serving as mentors/sponsors in <i>FIRST</i> programs.</b>                                                                                                                                                                                                                                 |
| All 16 alumni in the past 3 years continued education in STEM careers. Our alumni are prepared to challenge themselves, with graduates pursuing degrees at top universities such as Stanford, Purdue, and UW-Madison and interning at high-level companies like Boeing and Milwaukee Tool. Our graduates give back through the UW-Madison FIRST Alumni group, FRC/FTC/FLL mentoring, and FIRST volunteering. 69% support FIRST by volunteering at events and/or mentoring, and 50% came back to support TWIST. |
| <b>Describe your community along with its unique opportunities and circumstances. Think about your geographic region, diversity of town/school, language barriers, socioeconomic barriers, and cultural expectations.</b>                                                                                                                                                                                                                                                                                      |
| WarriorBots are from Southeast Wisconsin, an area packed with FIRST teams. This density allows us to sustain close relationships with other teams. Through our connections with other teams, we host WarriorWATCH, even at events we do not attend, host informative presentations, and help other teams' initiatives through support & volunteering. We hold space for our local FTC & FLL teams at TWIST. Here, FTC teams demonstrate to a large audience and FLL teams get a full competition experience.   |
| <b>Describe the team's methods, with emphasis on the past 3 years, for spreading the <i>FIRST</i> Mission in ways that are effective, scalable, sustainable, and creative.</b>                                                                                                                                                                                                                                                                                                                                 |
| Our adaptable STEM learning programs brought in-depth STEM explorations to 261 kids and microlearning experiences to over 2500 kids in the past year. At local community events, we host a variety of Innovation Stations to draw attention to STEM. From these events, we encourage families to explore other opportunities for STEM learning we offer: such as our CREATE workshops or participation on an FLL team. We prioritize keeping all of these opportunities free and easily accessible.            |
| <b>Describe your team's goals and the progress you have made towards them to fulfill <i>FIRST's</i> Vision.</b>                                                                                                                                                                                                                                                                                                                                                                                                |
| We aim to make STEM visible and accessible to all. In 2023, we began our ongoing relationship with local middle school STEM teachers to ensure all Muskego students are aware of the opportunities they have. We advocate with other teams to our state government to achieve additional funding and support to keep FIRST accessible by maintaining relationships with our local legislators and attending FIRST Wisconsin Advocacy Day each year, and in 2024 we raised the funding to \$750,000.            |

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| <p><b>What impact has your team seen from your efforts described in the above question? How does your team measure impact?</b></p>                                                                                                                                                                                                                                                                                                                                                                                         |
| <p>Our community presence has led to increased interest in the FIRST program, with 43% of the WarriorBots being made up of first-year students. Documentation is a key principle to our impact. After TWIST, we send out post-event forms to gauge its influence on teams' culture and demographics. We also put emphasis on numerical documentation by measuring the number of attendees at outreach events, teams and members of the FIRST community reached, and situational data like LEGO sets donated at TWIST.</p>  |
| <p><b>Please provide specific examples of how your team and team members act as role models within the <i>FIRST</i> community with emphasis on the past 3 years. How do you share these best practices with other teams?</b></p>                                                                                                                                                                                                                                                                                           |
| <p>Our 23 team members averaged over 55 hours of community outreach each since the end of last season. We run WarriorBots Helping Others (WHO), host workshops at local events, and publish programming resources. This season, our students spent 554 hours volunteering and mentoring to support FLL and 83% mentored FLL teams. The WarriorBots create leaders; Since its inception, we have had students serve on the WI Student Board of Directors. We have had two Dean's List Finalists in the last two years.</p>  |
| <p><b>Describe your team's initiatives to Assist, Mentor, and/or Start other <i>FIRST</i> teams with emphasis on activities within the past 3 years.</b></p>                                                                                                                                                                                                                                                                                                                                                               |
| <p>We make FIRST accessible to all middle schoolers in our community by starting and mentoring FLL teams and encouraging membership from all 4 middle schools in our city. We share our design process through Open Alliance to assist FRC teams. We run our public scouting initiative, WarriorWATCH, at events to assist teams by standardizing knowledge, regardless of ability to scout. We host workshops on topics ranging from high-level programming to empowering women in STEM to assist teams holistically.</p> |
| <p><b>What other initiatives have you created, grown, sustained, or participated in (<i>FIRST</i> or otherwise) to help inspire young people to be science and technology leaders and innovators? What outcomes have you seen from your efforts in the past 3 years?</b></p>                                                                                                                                                                                                                                               |
| <p>We inspire the next generation to pursue STEM through play; in the last three years, our WarriorTOTS initiative has donated 3943 3D-printed toys to local Toys For Tots donation centers and US Marine Corps families. We donated 202 3D-printed toys to an all-girls educational institution in Hyderabad, India. Our LEGO donation drive for Children's Hospital of Wisconsin at TWIST contributed 229 sets in 2024. Getting these toys brings joy, inspiration, and STEM to children of challenging backgrounds.</p> |
| <p><b>Describe the partnerships and relationships that you've created with other organizations (teams, sponsors, educational institutions, government, philanthropic entities, etc.) and what you have accomplished together, with emphasis on the past 3 years.</b></p>                                                                                                                                                                                                                                                   |
| <p>We work with the Muskego-Norway district to share robotics with over 3700 people at 5 events annually and spread the FIRST message to 12000 households through an article about TWIST. For the last two years, we have partnered with the ALS Association to design and 3D print unique joystick covers for motorized wheelchairs. At TWIST 2024, we hosted 11 scholarship organizations and colleges at our Student Opportunities Fair. This year, we won the Education STEMMY Award at the STEM Forward event.</p>    |
| <p><b>Describe your team's efforts in the past 3 years to promote equity, diversity, and inclusion within your team, <i>FIRST</i>, and your communities.</b></p>                                                                                                                                                                                                                                                                                                                                                           |
| <p>For the last four years, our team has made and provided awareness pins at every off-season and regional competition we attend. These pins bring awareness to underrepresented groups such as the LGBTQIA+ community, people of color, and cancer survivors. We distribute about 2500 pins each year. Also, we break down financial barriers to make TWIST accessible by subsidizing fees through sponsorship and offering a registration grant. In 2024, the grant enabled four teams to come to TWIST.</p>             |

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| <b>Explain how you ensure your team and the initiatives you have created will be sustainable.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                           |
| Our team has seen continuous success in recent years through our sustainable strategies and programs. To reach a larger audience and give a more personal experience, we host open houses for FLL and FRC to gain more students. During the year, we gauge the skills of our members in all aspects of the team through core competencies, which shows what our team needs to focus on. Additionally, we run a sponsorship drive for TWIST to gain concession and monetary sponsors to ensure continued success.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                           |
| <b>Highlight one area in which your team needs to improve and describe the steps actively being taken to make those improvements.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                           |
| Assessing program impact is important for effective outreach. In the past year, we implemented methods to track how many STEM learning interactions we create. We are currently strengthening our methods for assessing the impact of our programs by gathering qualitative data in addition to quantitative data to inform our STEM learning program development and TWIST event experience. We do this by creating surveys to collect direct feedback from participants, which is used to better the experience.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                           |
| <b>Briefly describe other matters of interest to the <i>FIRST</i> 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, particularly noteworthy, or had a large impact.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                           |
| TWIST, Together Women in STEM Thrive, is our event to promote women in STEM through FIRST. TWIST has a full-scale FRC competition where all-girl drive teams are required, an FLL scrimmage, and an FTC demo. TWIST is hosted each year in October to encourage teams’ recruitment of girls and allow them to boost their confidence and show their colors. This year we had 6 FTC, 12 FLL, and 30 FRC teams representing 4 different states and over 2600 attendees, with over 3800 attendees over both years!                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                           |
| <b>Judge Feedback</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                           |
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| <b>Essay</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                           |
| <p>The WarriorBots are gearing up the next generation of science and technology leaders—building a team and changing a community with our endless desire to share our love of FIRST. Everything we do centers on our vision to inspire and engage kids of all ages in STEM and robotics.</p> <p>{Getting the Word Out} Bright yellow balls whizzing through the air, young kids running up to press the large red button, and boys and girls jumping up and down trying to beat their personal records of how many they could catch at a time: we created our demo bot in pursuit of drawing kids and their families to our station at community events. STEM education can only begin when people are made aware of the possibilities.</p> <p>Our team visits community events each year, showing off our demo bot and engaging our community in STEM microlearning activities. Our Innovation Stations provide ways for any child to get a brief introduction to a STEM topic that hopefully inspires them to explore further. We developed four STEM stations, scaled to reach different age groups: toy robots, LEGO gear spinners, trajectories, and a line follower. These lessons all include hands-on experimentation and explanations of STEM concepts. Kids get excited about showing up to these stations, going from one to the next with passion growing as they see the possibilities of STEM.</p> |                                                                                                                                                                                                           |

{Inspiring the Next Generation} We are creating opportunities to explore STEM outside the classroom, which are otherwise unavailable to many students in Muskego and surrounding communities. Our CREATE (Curiosity and Robotics Exploration Activities for Tomorrow's Engineers) workshops aim to allow any interested child to get an introduction to a variety of STEM topics. These sessions are free and centered around hands-on learning. Over the last summer, our 28 attendees grew their STEM skills by building their own catapults with 3D printed material, learning about circuits, and creating animation through code. After seeing how much the kids enjoyed the workshops in 2023, we increased it from two workshops to three. Our workshops are engaging; most kids who attend one workshop return for the next.

For the last three years, we have started and mentored FLL teams to allow membership from students at all of Muskego's public and private middle schools. Our team sources sponsors for these teams to keep membership cost-free for all kids.

FIRST Wisconsin is highly populated with teams but struggles to support the number of competitions required to maintain these teams. Our team is dedicated to supporting through volunteering. This year, our students spent 297 hours volunteering at 11 FLL challenge competitions, 73% of events statewide. Our members also volunteer at FTC and FRC events to support all levels of FIRST competition.

Raising the visibility of STEM involvement to young women is important to us—that's why we are a Girl Scouts of Wisconsin Southeast Community Event Provider. Through this, we invite all Girl Scout troops in our area to visit our women in STEM-centered event, TWIST, and see robotics and female empowerment in action!

Our initiative, WarriorTOTS (Toys Teaching STEM), uses toys to bring STEM education through play to disadvantaged kids. In the last three years, we have created/donated 3743 3D-printed toys through the Toys For Tots Foundation to local donation centers and 200 toys to Marine Corps families. These toys include informational cards to teach kids in simple terms about the 3D printers that made these toys possible. The population of Milwaukee is 20.2% Hispanic, so we printed these cards in both English and Spanish to ensure all recipients can learn. We have also donated 202 toys to Tanvir-E-Niswan, an all-female educational institute in Hyderabad, India. With a female literacy rate below 80%, we are bringing easy access to STEM education to a city desperately in need. One final aspect of our WarriorTOTS program is our LEGO donation drive. These LEGO sets allow for creativity, inspire engineering concepts, and bring joy to brave hospital patients. This year, we donated 229 LEGO sets to Children's Hospital of Wisconsin.

{Breaking Down Barriers} We design and 3D print awareness pins for underrepresented groups to make all feel welcome in the FIRST community. We distribute these at every event we attend. So far, we have designs representing the LGBTQIA+ community, people of color, and cancer survivors. Kids from teams all around come to our pit in search of these pins and we take requests on what groups we should create pins for next. These pins provide people a way to show their passion for belonging and raise visibility, making everyone feel included and strengthening the FIRST community.

Our event TWIST, Together Women in STEM Thrive, shows women on FIRST teams that they are ready and capable leaders. At its core, TWIST is a competition with a twist, as robots are driven entirely by girls in exciting competition between teams from across the Midwest. But TWIST goes beyond robotics to provide an inclusive, safe environment for girls to gain confidence and grow their skills. Giving girls the opportunity to take these leadership roles in a supportive environment allows them to thrive and recruit more young women to join, helping to address the low participation rate of girls in FIRST. As of last year, only 26.8% of participants in the FRC Wisconsin program were girls, a disparity that we strive to improve through our efforts.

TWIST, beginning in 2023, brings together FRC, FTC, and FLL teams in a one-day opportunity to show off their skills, grow as leaders, and feel empowered. At TWIST 2024, 30 FRC teams from four states came together to compete in an all-girl drive team competition. Teams with not enough girls joined forces to compete as a partner team. FTC

teams demonstrate their robot to thousands of attendees and FLL teams collaborate to improve both their robot and innovation projects through a full-day mock regional. All students benefit from visiting any of the 11 participating colleges and scholarship organizations featured at our TWIST Student Opportunity Fair.

We refuse to let financial difficulties be the reason any team can't access this opportunity. Through our extensive efforts within sponsor recruitment and engagement, TWIST minimizes our registration fee from \$300 to \$100 and features a registration grant that covers all costs for teams in need. This year, four teams could attend this event through the grant.

{Supporting the FIRST Community} Helping teams perform at their best, in and out of competitions, is a core aspect of our team culture, forming the basis for our WarriorBots Helping Others (WHO) program. Through WHO, we assist teams with mechanical, electrical, and programming issues and share our tools and materials. We have helped teams prepare their robots for matches, create successful autonomous paths, and fix motor controllers. At all events we attend, you can see our team members running to and from our pit, grabbing tools as they help any team in need.

We work directly with other FRC teams to inspire all teams to grow and compete at their best. To help raise the floor in FRC, one of our goals is to provide high-quality scouting data for all teams, even those who do not have the resources for a dedicated scouting team. Our scouting program, WarriorWATCH, debuted in 2022. We partner with other teams to gather data and share it at events our team does not attend. Through these partnerships, we provided data at 10 competitions to 173 teams over the last three years.

Outside competitions, we maintain strong relationships with other FRC teams, like team 6643. We connected with them when they sought advice about robot design, fundraising, and marketing. Our team mentored them virtually and in person in the off-season to share our knowledge about goal-setting, team branding, sponsorship, and developing an effective robot. We connected them with one of our sponsors and encouraged them to participate as a partner team in TWIST, allowing them to work with an experienced team and gain valuable skills.

Over our history as a team, we have built up technical knowledge that we proudly share for the benefit of all teams. Our team members use their expertise to host workshops at local offseasons, on topics such as autonomous programming, drivetrain characterization, and recruiting and engaging girls in FIRST. In 2023, when many teams were experiencing difficulties with updates to system identification, we published our original code for drivetrain characterization and created a second project to help teams who use REV products.

Through a partnership with the FIRST WI Student Board of Directors, we work to create equal opportunities for all FRC and FTC teams, regardless of their resource level. For the last two years, we have been a hub team for the Production Hub initiative, manufacturing parts for teams without advanced capabilities.

{A Better Future} Our team members are passionate about building a better future for FIRST. We attend the FIRST Wisconsin Advocacy Day every year at the Wisconsin State Capitol, to join with other FIRST teams to advocate for an increase to the Wisconsin Department of Public Instruction grant for FIRST teams in the state. In 2024, we increased annual funding from \$250,000 to \$750,000.

To further state-level funding for FIRST teams in our state, we maintain relationships with state legislators in our district. Our state senator and representatives have attended community events, toured TWIST, and met with us in our workspace. We value these relationships and ensure our continued communication helps improve the status of FIRST in the state.

We make our presence felt in our community. We build robotics opportunities for everyone, a supportive FIRST community where all teams can succeed, and STEM education for young people in and around Muskego. Through our expansive impact, we build a better future, one gear at a time!



