

## FIRST Impact Award - Team 4096

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| <b>2023 - Team 4096</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Team Number</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 4096                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Team Nickname</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Ctrl-Z                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Team Location</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Champaign, IL - USA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Describe the impact of the <i>FIRST</i> 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 <i>FIRST</i> programs as mentors/sponsors.</b>                                                                                                                                                                                                                                     |
| As a result of FIRST, all 200+ Ctrl-Z graduates have gone on to attend college, with 95% pursuing STEM majors. Our team understands the merit of community, leadership, innovation, and Gracious Professionalism. Our members employ these values in their future endeavors as well. Many Ctrl-Z alumni stay active in the FIRST community by mentoring teams, volunteering at robotics competitions, displaying leadership qualities, and instilling a sense of innovation in the next generation of FIRST.       |
| <b>Describe your community along with how your team addresses its unique opportunities and circumstances.</b>                                                                                                                                                                                                                                                                                                                                                                                                      |
| As COVID hindered our ability to connect with our community, we recognized how our proximity to UIUC gave us the opportunity to contribute in a different way. Taking advantage of our resources, we designed and 3D-printed 794 shields and distributed them to 44 organizations. We also designed and fabricated 5 full-cover masks to aid hearing-impaired community members that were tested at the UIUC Audiology Lab. Additionally, Engineering Open House and Robot Day are opportunities provided by UIUC. |
| <b>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?</b>                                                                                                                                                                                                                                                                                                        |
| Since COVID, our team has personally reached 150+ kids with the FIRST vision because of our sustainable summer camp. Our annual STEM camp has reached a new target group through a partnership with our local boys and girls club. Our camp is incorporated into their daily program with no charge. Because of this, the core values of FIRST are brought to a lower-income audience. Each year, our students reflect and improve upon our camp to further the local kids' learning and enjoyment of STEM.        |
| <b>Please provide specific examples of how your team members act as role models within the FIRST community with emphasis on the past 3 years.</b>                                                                                                                                                                                                                                                                                                                                                                  |
| The first thing we establish for new Ctrl-Z members is the importance of community service. Volunteering is a necessity on our team. We require 10 cumulative hours of volunteering to attend FRC competitions.                                                                                                                                                                                                                                                                                                    |

At our outreach events, like FLL competitions and school demos, we exhibit FIRST Core Values with positivity and kindness. We also embody the core value of Gracious Professionalism by displaying scouting data in our pit during competitions to help every team make informed alliance decisions.

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

Over the past three years, Ctrl-Z has started five FTC teams, three of which are in Paxton, IL. Our daughter team, Ctrl-Y, qualified for state last year. We provided them materials, shop space, and mentorship, hoping to teach the students the Ctrl-Z values, the means to reach their goals, and the importance of knowledge. In 2021, Ctrl-Z created 18 instructional STEM videos to teach essential skills to new FLL teams. Additionally, this year we mentored FLL teams at the DREAAM House program.

**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?**

The Summer Youth Robotics Academy (SYRA) is an annual STEM summer camp Ctrl-Z founded. The initiatives of SYRA are to inspire creativity, teamwork, and innovation through activities such as coding, robot building, and STEM projects. We have STEM professionals present at SYRA, teaching students about careers in technology. Currently, 10% of students on Ctrl-Z joined because of SYRA! Also, at Space Jam we provide necessary skills for BSA scouts to gain their robotics and coding merit badges.

**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**

In 2022, Ctrl-Z continued its partnership with the local Boys and Girls Club to host SYRA. In 2021, we partnered with the 4-H State Office to create 18 tutorial videos for FLL teams. We continue to engage with our sponsor, Caterpillar, to demonstrate at events such as the UIUC Engineering Open House and RoboRumble. Our team regularly collaborates with FTC team Ctrl-Y to host local FLL qualifiers, and we also work with the UIUC Coordinated Science Laboratory to enhance audiology research.

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

Ctrl-Z is from the Champaign-Urbana area, a naturally diverse community. Ctrl-Z embodies this diversity by embracing every unique perspective. Since 2019 at least half our student leaders have been women. Additionally, Ctrl-Z has an increasing percentage of children of immigrants and bilingual members with ~1/3 team members able to speak at least two languages. Ctrl-Z prides itself on giving everyone an opportunity to learn about robotics and interact with FIRST no matter their background.

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

Ctrl-Z reserves an annual \$2,500 grant from the Bayer Fund exclusively for the next year's summer camp, ensuring SYRA's future success and impact on those in our community that lack affordable STEM opportunities. We also partner with sponsors, such as Caterpillar, and outreach organizations to ensure our team's future funding. Ctrl-Z has recently started a co-captains system that helps knowledge get transferred to the younger members so they can continue our vision.

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

Ctrl-Z collaborates with our main sponsor Caterpillar by hosting and demoing at RoboRumble and the Engineering Open House, inspiring FIRST values in students. A proud 4-H team, we partnered with the State Office to create robotics workshop videos for kids. With CS+X we helped construct a model of the Mahomet aquifer to educate students on water quality and environmental issues. Recently we requested Caterpillar reduce our sponsorship to allow them to increase their support of other teams.

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

The majority of our team being younger students, we need to prioritize establishing and passing on effective, easy to run events to the next generation of student leadership. One such event is a weekly after school STEM activity we now host at the Champaign library that is open to all youth. Currently, we are also reaching out to libraries in Champaign-Urbana to test activities and survey interest. Ctrl-Z wants to establish routine, sustainable events that will impact the youth in our community.

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

Ctrl-Z believes in educating the youth about equity, progress, respect, and safety. Just last year, we made comprehensive STEM videos which we distributed to numerous students and teachers. These videos are available online and are used to educate 1st-6th graders on STEM topics with minimal cost. Ultimately, Ctrl-Z wishes to spark the curiosity that will lead us into the future. By striving to reach our entire community, we become one step closer to securing the future.

**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.**

Ctrl-Z focuses on bringing STEM to underserved groups by holding events such as Robot Day, Space Jam, and SYRA, ensuring all students are given equal STEM opportunities. BSA scouts are encouraged to join FIRST teams after receiving their merit badges, and SYRA students often continue with FIRST. In fact, 10% of our current team learned about FIRST while attending SYRA. Despite great progress towards this goal, Ctrl-Z will never be satisfied until there is true equity within the STEM community.

## Essay

Who Are We? Ctrl-Z! In 2011, 20 FLL students came together to start Ctrl-Z. Now our team consists of 39 students from 9 schools in the C-U area. Ctrl-Z works to reduce the gender and diversity disparities

within STEM fields with 1/4 of team members and 5/8 of captains being female. It is important for our team to have diverse backgrounds, with 40% of our members fully bilingual, speaking languages such as Russian, German, or Urdu. We strive to provide STEM exposure to as much of our community as possible regardless of race, age, or gender, and especially to those who would otherwise not be exposed. Because of the huge impact FIRST has on our lives, Ctrl-Z seeks to be a messenger and promoter of innovation and Gracious Professionalism throughout our community.

FIRST Pipeline and Events Ctrl-Z helps students traverse our carefully designed FIRST Pipeline, immersing them in the world of FIRST Robotics through its various programs, preparing them for a future in STEM. Beginning with our Summer Youth Robotics Academy (SYRA), students are introduced to FIRST, along with its values of Gracious Professionalism, teamwork, and innovation. Students are encouraged to join 1 of 10 FLL teams in the Champaign-Urbana area, two of which were started by Ctrl-Z with the help of our sponsors and the Unit 4 School District. From there, students can join one of the FTC teams in the area. Ctrl-Z has mentored 6 FTC teams, all of which we started in the past 5 years. FTC team Ctrl-Y, started by Ctrl-Z, worked in our shop space for multiple years, and we maintained a close connection by sharing resources and mentors while we shared shop space. In 2018, we started 3 FTC teams in a nearby rural town, Paxton, where we helped find funding, led training workshops, and provided tools, ultimately changing the robotics culture in the town. Students we mentored through the FIRST Pipeline are encouraged to join our team to continue their experience in STEM and FIRST. In fact, nearly 10% of our team members are SYRA graduates! Beyond Ctrl-Z, our Pipeline continues to impact our alumni. 95% of our graduates enter STEM fields using the valuable communication, business, and outreach skills they learn from FIRST. We currently have 4 FRC alumni as mentors, 2 of which are from Ctrl-Z, assisting us as they continue to grow in their respective STEM educations and give back to FIRST. Another way Ctrl-Z shows its appreciation to FIRST is by volunteering at other FIRST competitions. Our team members act as role models to younger students, encouraging them to continue in the FIRST community to the highest level. We host an annual FLL Discover Expo for local teams, where our members act as judges, setup, and tear-down crews. Ctrl-Z has held demonstrations at a FTC league meet and FLL qualifier, and built two Field Set-Up Kits. This year Ctrl-Z presented at the FLL State Qualifier to all teams at the event about possible futures with FIRST and STEM. Each year for the FLL State Championship Ctrl-Z provides crucial assistance with 20+ volunteers, 22 competition tables, and 4 table carts. The volunteers set up, clean, act as judges, runners, referees, and even game announcers.

**Community Outreach** Our team causes a significant impact in our community through local festivals, business openings, summer camps, STEM days, and more. Though COVID-19 has heavily impacted our ability to physically attend community events, in the past 3 years Ctrl-Z has attended/hosted 30+ outreach events. In total, our team has volunteered 752 outreach hours over the last year where they engaged the community in STEM and promoted FIRST programs. Ctrl-Z also gets involved at local schools by hosting robotics demos for 3+ high schools, including an at-school STEM fair and a summer class at Urbana High School, a public school with a large percentage of low-income students. Beyond outreach in our local area, Ctrl-Z also started a coding club in Decatur, and 2 FTC teams in Paxton, demonstrating our dedication to spreading the FIRST vision. For many years we've partnered with a local nursing home, Clark-Lindsey, to present our robot and STEM advancements to elderly residents, sharing the excitement of robotics with every age group. Another new, unique team project is collaborating with researchers at the UIUC Coordinated Science Lab (CSL) to combine robotics and audiology research and further technological advancements. Ctrl-Z members have also attended MARS (Magical Acoustic Room System) meetings to understand more about the needs of the lab. Then, we created an

animatronic turret mounted with a mannequin head, allowing for more advanced collection of audio data.

**Virtual Outreach** The COVID-19 pandemic presented barriers for in-person learning and outreach. In response, Ctrl-Z adopted various methods of online education to reach students of all demographics. In 2020, our team created four STEM activity videos that could be completed with inexpensive supplies at home. Our videos were posted publicly on YouTube and sent to three local classrooms (approximately 65 2nd-5th grade students) with all the required supplies included. Last year, we continued our virtual presence by partnering with the 4-H State Office to create 18 video tutorials on how to build, code, and problem solve with the Spike Prime, Robot Inventor, and EV3 kits. In February 2022, our first 4-H team users began to learn about robotics using our videos!

**Summer Youth Robotics Academy (SYRA)** Ctrl-Z's mission is to spread STEM ideas and introduce youth to FIRST; therefore, when we recognized the lack of affordable, high-quality camps in Champaign-Urbana in 2016, we decided to create SYRA. With a 23.9% poverty rate in Champaign-Urbana, SYRA caters to all youth but we especially want to impact economically disadvantaged students. At \$250, SYRA was 25% of the cost of local UIUC summer camps. Additionally, local Unit 4 teachers nominated financially disadvantaged students to receive full scholarship, including meals. SYRA consists of students working together to build and program EV3 kits, participating in STEM activities such as an egg drop and straw roller coasters. Additionally, companies and organizations such as EarthSense, Volition, and the UIUC Biomedical Engineering Society have been kind enough to visit the students and talk about their projects and personal stories of working in technology. Unlike previous years, in 2021 our team established a partnership with the Don Moyer Boys and Girls Club to host SYRA. As opposed to the traditional 20 students per week, in 2022 we worked with the 66 2nd-5th graders enrolled in their summer program. Ctrl-Z attended the Boys and Girls Club for one week providing EV3 robotics kits, laptops, and other necessary supplies at no cost to the organization or students. In the past 7 years, over 250 students have participated in SYRA, 60 of which were provided a full scholarship. Excitingly, about 10% of our current team members were first introduced to FIRST through SYRA! Our camp is vital to increase awareness of FIRST and Ctrl-Z in our community, especially to students who have limited access to STEM education. The camp is free-of-charge for participants and space is provided for the camp, and Ctrl-Z allocates \$2500 from our Bayer Fund sponsorship to sustainably educate students through SYRA.

**COVID-19 Response** At Ctrl-Z, our priority is a safe environment for our team to work in. Our safety guidelines are regularly updated to what the CDC and local experts advise. We prioritize sanitization, masks, and social distancing, which we have fortunately been able to transition out of as concerns wane. Alongside in-person procedures, we provide an online venue so members could remain active remotely. Last year, virtual students recorded informative 4-H videos, developed robot code, designed components via CAD, and worked on award submissions. Just like how we ensured safety protocols to keep our team safe, we also strived to protect our local community during the pandemic. We used our machinery to create 3 different face shields and tested their effectiveness against COVID-19. Maximizing the efficiency of production, we created and distributed over 794 PETG plastic face shields with 3D printed and CNC machined headpieces to 44 groups in need.

**Sponsors** The positive impact Ctrl-Z has on our community would not be possible without the support of our sponsors. As a FIRST Strategic Partner, Caterpillar is our biggest sponsor and has supported us since our inception in 2011. To thank Caterpillar for their contributions and share FIRST's vision with other organizations, we have co-hosted and attended the annual RoboRumble event and demo our robot

alongside the Caterpillar booth at the annual UIUC Engineering Open House. A local sponsor, the CS+X Foundation, supports the team with access to shop space. Ctrl-Z works in the CS+X Foundation's Learning Lab, with members of the Unit 4 school district able to tour the building to see our robots. In 2018, we helped CS+X build an expansive room-wide exhibit featuring a scale model of the Mahomet Aquifer. Ctrl-Z programmed an animated, interactive LED light show in the aquifer to visually demonstrate how water is filtered, teaching local youth and educators about environmental issues for 7 years.

Future Since 2011, Ctrl-Z has created an environment of learning & innovation within our team and community. From hosting summer camps to providing face shields, we strive to follow FIRST's message of creating the STEM innovators of the future, and most importantly, leaders who embody Gracious Professionalism. Our mission is to provide opportunities inclusive to everyone, especially students from socioeconomically disadvantaged and minority backgrounds. We are proud of our accomplishments and always strive to do more. With Ctrl-Z there are no shortcuts, and we continue working with our community "till it's right.";

