

Chairman's Award - Team 4013

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2021 - Team 4013

Team Number

4013

Team Nickname

Clockwork Mania

Team Location

Orlando, Florida - 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.

Students get hands-on experience in CAD, programming, machining, & hone responsibility & leadership skills. 100% of our members are accepted to college, with alumni from the past three years attending universities like GT, Duke, & MIT. Six of our alumni mentor teams. Members intern with companies like Northrop Grumman & P&G. Students are encouraged to explore subjects that interest them to inspire a pursuit of learning. Above all, our members strive to build a family of Clockwork Maniacs.

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

Our local *FIRST* community thrives through the support we provide. Our tenured team offers a well-equipped workshop & experienced mentorship to our school & community teams. To support the disadvantaged community we are located in, we have utilized our unique influence to earn a \$25,000 grant from Best Buy to buy & donate 45 laptops to 2 local Boys & Girls Club chapters. These laptops will enable underserved students to continue their education virtually & provide technology to FRC team 6473.

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?

To fulfill *FIRST*'s mission to transform our culture, we promote STEM & *FIRST* to a broad audience. Our Down Syndrome Foundation STEM Days & demos at GKTW & Dreamflight bring *FIRST* & STEM to new groups. We hold demos & share our experiences with legislators & school board members to promote *FIRST* in education. We see results via the diverse set of teams we start & mentor, like the FTC teams we've formed through parent interest meetings or the FRC team we started at our local Boys & Girls Club.

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

We have directly mentored 45 teams & assisted countless others. Through year-round events, our team has clocked over 9,100 hours of community service, showing other teams that *FIRST* is more than just robots. We have mentored 7 other teams in the past 3 years in business & technical skills. Members & mentors set an example for other *FIRST* teams by leading our local FTC league & volunteering at *FIRST* events at the local, state & championship level, with an emphasis on virtual events this year.

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

We've started 38 *FIRST* teams through presentations, workshops, open houses, & demos, all of which promote interest in *FIRST*. These efforts have been fruitful, with many interactions leading to new students joining a team or starting their own. After running a STEM summer camp for 25 homeschool students, they started their own FTC teams which have run for three years with our mentorship. In the past 3 years, we have started 3 teams & mentored 3 teams transitioning from FLL to FTC.

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?

After our relentless efforts, our school added an engineering academy that has enabled 1/3 of our school's students to pursue a 3-year engineering track. We have also run an Autodesk CAD certification center for the past 4 years which has prepared 186 students to take the exam. These initiatives have allowed students at our school to be exceptionally prepared for & motivated towards a future career in STEM.

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

This year, Best Buy partnered with us to support the education of underserved students in our community by providing a \$25,000 technology grant. The 53 laptops we are donating with these funds will go to disadvantaged students for distance learning, an FRC team in need, & underprivileged students on our teams & in the engineering academy we founded. We've also worked alongside NASA, Tupperware, & Tech Shot through the PONDS program to revolutionize the way we approach food production in space.

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

Our team is exceptionally diverse, with 65% of students being part of a minority group, making inclusion deeply important to us. For students on our team unable to afford trips & fees, we set aside team funds to pay for them to ensure that every student is included. In our community, we provide enriching STEM opportunities to groups that are often overlooked through our demos at GKTW & Dreamflight, our work with the Down Syndrome Foundation, & our summer camp for home-schooled students.

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

Clockwork maintains the support of our sponsors to invest in our future. Our primary sponsor, Orlando Science, provides us with equipment & a workspace to keep our team running. To preserve this relationship, we volunteer at their events, represent them at our demos, & aid them in accreditation. Within our team, we have bought laptops for each division and built up a robust workshop to ensure members can keep the team running smoothly & continue building robots for years to come.

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

When our sponsors host events, we make it a priority to attend. We've run a *FIRST* demo at NASA's Dreamflight events the past 3 years it has been held, volunteered at Lockheed Martin's FLL tournaments for 2 years, & attended Lockheed Martin's E-week for 3 years. Every year we also demo for our school at public events like open houses & conventions. Our work with our other sponsors allows us to promote their events within our school & community.

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

Clockwork strives to provide a workspace that can support the numerous teams that we have started, mentored, & assisted. However, in the past several years, our workshop has become crowded as a result of our efforts. The COVID-19 pandemic has only exacerbated these issues & our workshop's limited space has hindered our efforts to support these teams. To expand our reach, we are actively working with our school to open up a second robotics lab on our middle-level campus.

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

To inspire a new generation of STEM professionals, we dedicate hundreds of hours teaching students in our community. We have volunteered over 250 hours at our local library teaching robotics classes & ran a "Girls Who Code" club for elementary & middle school students to bring STEM to a more diverse audience. Clockwork also donates its time to numerous scout troops to help them earn their robotics merit badges - this year, we ran 2 Girl Scout merit badge events virtually for four troops.

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.

To us, *FIRST* is more than a competition - it's a platform for students to impact real-world industries. This year, we reenergized our program, "COG"nitive Solutions, which provides occupational therapy (OT) equipment to OTs in need at

no cost. We've completed a range of projects including everything from sensory-friendly stools for kids with autism to an app that tracks patient behavior. We've donated over \$1,000 in equipment to underserved OTs, showing STEM professionals the power of FIRST.

Essay

Our world is ever-evolving, with game-changing innovations shifting how we work, play, & live more rapidly than ever before. The education of today must prepare a new generation for the work of tomorrow that doesn't exist yet & cannot be clearly defined. This shapes FRC 4013 Clockwork Mania's mission - to push for new methods of education through FIRST to change our culture.

Clockwork's Maniacs come from many ethnicities & backgrounds, making diversity a priority. We aim to introduce young women, minorities, & underserved communities to the opportunities that FIRST provides. We start with a strong bond among our members; we are one big family, composed of dedicated alumni, members, & mentors. Our team structure emphasizes the role of student team leads to guide newer members. Student leaders & mentors present offseason workshops on topics like milling/machining, CAD, laser cutting, 3D printing, CNC machining & assembly to prepare the team. We strive to create STEM innovators and leaders.

We use our skills beyond building robots through our 3-part outreach program, "Making the Clock Work". The first part of our program "Making the Community Tick" engages & supports the local community with student-run programs that promote a passion for education & FIRST. The next part, "Meshing with Public Figures" collaborates with major media, political figures, & professionals in STEM fields to introduce STEM to a larger audience, bring attention to the importance of STEM & apply our work to real-world industries. Finally, "Winding up the World" introduces, expands, & sustains STEM programs to inspire the world's future problem-solvers.

Making the Community Tick

The COVID-19 pandemic has created an unprecedented situation for classrooms around the country, with students having to move to remote learning. With this shift, a gap has formed in the availability of education for underprivileged communities, as students without computers at home have been put at a disadvantage in their education. In our continuing initiative to make education accessible, we applied for & received a \$25,000 grant from Best Buy to buy & donate laptops for students in underserved areas. We are donating 45 laptops to 2 Boys & Girls Clubs which serve disadvantaged middle & high school students. 20 of these laptops will be taken home by students for distance learning, while the rest will remain at the Boys & Girls Clubs for students to use for homework, extracurriculars, & their in-house FRC team for years to come. We are also donating 8 laptops to disadvantaged students in our school's robotics teams and PLTW engineering program to ensure that every student can access this enhanced education, regardless of their financial situation.

Beyond inspiring the next generation of engineers, Clockwork Mania sustains existing FIRST teams as a leading member in our local FIRST community. During our team's tenure, we've volunteered at & hosted annual FIRST events like FLL & FTC Tournaments, FTC Judgement Days, FTC Practice Days, & FRC kickoffs. In total, we've hosted 308 local & international teams at 32 events! We've started 38 FIRST teams & mentored 45 by helping them register & apply for grants & by providing continued guidance, resources, & access to our workshop. In the past three years, we started 3 FIRST teams & mentored 7. We also graduate students & teams through FIRST's program. To sustain our FRC program, we recruit students from local FTC teams & support them through the transition with student mentorship & annual workshops on a variety of FRC topics. Within the last three years, we transitioned FTC Teams 15064, 15065 & 15067 from FLL to FTC & mentored them through the process.

To ensure our local FIRST community continues to thrive through the pandemic, we opened up our workshop with enhanced safety measures to five FTC teams, providing the resources & machinery they need to complete their robot. We hosted 3 remote competition days, making our FTC field available to local teams so they can compete safely. We are dedicated to maintaining our FIRST community through thick & thin, & will continue to make these resources available throughout the pandemic.

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Meshing with Public Figures

Clockwork takes initiative to attract political support for STEM Education to impact real-world policy. We've met with the Mayor of Orlando, Buddy Dyer, & Senator Soto multiple times to discuss the importance of STEM programs in the community. We've met with Senator Bill Nelson & the Mayor of Lake Mary at the grand opening of our Seminole County STEM school, to introduce them to the FIRST program. We also frequently invite Orange County Public Schools Board members to tour our workshop & discuss the importance of emphasizing STEM in education. Our team has been featured on the local, national, & international news, like article features & several local news segments about FIRST, our team, & our accomplishments. Through our community outreach & media sites, our team has reached over 6.87 million people. This number comes from 4.2 million through magazines & newspapers, 1.7 million through television, 817,000 through direct outreach, & 149,500 through social media.

Our members have had the unique opportunity to collaborate with STEM professionals to change the world. Tupperware approached our team in 2018 to machine parts using our laser cutter for NASA's PONDS project, which aims to find more effective & efficient methods to grow food-producing plants in space. The pieces originally used for watering the plants had been cut by hand, creating uneven time-intensive parts. For the last 3 years, our students have laser-cut effective parts for Tupperware & NASA. The most recent set of PONDS experiments we contributed to lifted off for the International Space Station on March 1st, 2020 to great success. Our work is revolutionizing how the world approaches future long-term endeavors in space.

This year, we've reenergized our program "COG"nitive Solutions, which designs, manufactures, & ships occupational therapy equipment to underserved occupational therapists (OTs) working in education. We have worked on seven projects this year that are in progress or completed. For one of our OTs, we designed & manufactured 5 stools for autistic elementary students with sensory issues that inhibited their learning. The students were uncomfortable because their feet couldn't touch the ground, but with stools we manufactured, they felt more secure & engaged while in class. We saved the OT \$600 out of pocket with the equipment we donated at no-cost. A few other projects we've completed this year include writing templates for students with autism, equipment used to practice fine motor skills, 3D printed adaptive aids donated to an OT college to demonstrate technology's applications in healthcare, & more. Some of our projects from past years include a diagnostic kit & an app that can track patient behavior. In total, we saved underserved OTs over \$1,000 in equipment through this program.

Our work on the PONDS project & "COG"nitive Solutions shows STEM professionals what FIRST can do in the community & beyond. We strive to bring awareness of FIRST into real-world industries to show that FIRST is more than just robots.

Winding Up the World

Clockwork Mania is a well-known figure in our school's community that takes the initiative to revolutionize our school's curriculum. After our team's relentless efforts, our school added an engineering academy, inspiring over 1/3 of our high school students to pursue an engineering track. We also run an Autodesk CAD Certification testing center which has prepared 186 students to take the exam in the last four years. This enriched curriculum has attracted students from 5 counties & grown our school's student body from 125 to over 2,900. Students from our robotics & engineering program experience great successes, including a 100% college acceptance rate & attendance to universities like MIT, Virginia Tech, Duke, Georgia Tech, & Tuskegee. Our students receive internship & job opportunities at companies & organizations like Northrop Grumman, Procter & Gamble, VET Systems, Altec Industries, & the United States Space Force. We spread this success through our state by influencing the opening of 6 STEM campuses - 3 elementary schools, 2 middle schools, & 1 high school - through presentations, like the ones we hold for county school boards. We also demo at many of our school's events & open houses to introduce FIRST & STEM to a new audience.

To inspire interest in STEM outside of our school, we demo our robots virtually & in our community. We've attended STEM conferences like I/ITSEC & MakerFaire for 3 years & Otronicon for 6 years where we interacted with over 153,000 attendees. To reach new audiences that are often overlooked in our community, Clockwork has held 3 STEM days for the Down Syndrome Foundation of Florida (DSFF), & 3 demos at Dreamflight for children with disabilities or serious illness from the UK. We make it a priority to reach out directly to students in our local community. Within the past three years, we've volunteered over 250 hours at our local library teaching elementary students about robotics and donated our time to local Boy & Girl Scout troops to help them earn their robotics merit badges through the Central Florida Merit Badge University. We are inspiring the next generation of STEM professionals with our work.

Our impact on our community is timeless, having clocked over 9,100 hours of community service. Our team strives to serve as a role model team & exemplify the true meaning of FIRST. It is our mission to change our culture by introducing & sustaining STEM & FIRST programs around the world to improve the lives of underprivileged youth. Because we know the work we do amounts to great things, we believe that even the smallest gear makes the clock work!