

## Chairman's Award - Team 3824

### Team Number

3824

### Team Name, Corporate/University Sponsors

ORNL/UT Battelle/DOE MDF Advanced Manufacturing Office/Bechtel/Knox County Schools/Naoko Blue & Associates/Magnum Venus Products/Consolidated Nuclear Security/Techmeres Engineered Solutions/TVA/Alcoa/Strongwell/Soccer Taco/EPRI/IEEE/The Sharp Companies, Inc&Hardin Valley Academy

### Briefly describe the impact of the *FIRST* program on team participants with special emphasis on the 2016/2017 year and the preceding two to five years

FIRST has assisted team members in acquiring the interpersonal skills required to be adequately prepared for the workforce. This has been accomplished through team environment with emphasis on gracious professionalism. F?IRST has also helped members become more aware of potential career options through a variety of experiences pertaining to several disciplines. This is exemplified in opportunities p?rovided to F?IRST participants who intern at ORNL, where 3824 works.

### Describe the impact of the *FIRST* program on your community with special emphasis on the 2016/2017 year and the preceding two to five years

FIRST has enabled the team to affect the community through demonstrations for curious, inquisitive elementary students at Blue Grass Elementary's STEM Night and Dogwood Elementary's Art Carnival. Community events such as Robotics Revolution found the team answering thousands of questions from a larger audience. In addition to working with kids, 3824 brought to light STEAM concepts through robot demonstrations for employees at TVA's Employee Appreciation Day.

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

Europe has no FRC regionals, and 3824 has made strides in the past two years to remedy this through the establishment of a German Exchange program. This program is designed to provide support to the small FRC community in Germany, setting the foundations for FRC to become more widespread throughout Europe.

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

3824 pushes the limits of technology, experimenting with everything from biodegradable bamboo infused PLA filament, to pultruded fiberglass, and carbon fiber infused ABS used in 3D printing. The team does all of this while offering its knowledge to nearby teams, and in previous years, the team's buildspace. 3824 does this not to be emulated, but to inspire other teams to be innovative while retaining the spirit of gracious professionalism.

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

In addition to the German Exchange, a long-term effort to bring FRC to Europe, 3824 has taken the initiative to form FRC teams in the Knoxville Area. In the 2015 season, they started team 5571 and opened up their build space at the Manufacturing Demonstration Facility. 5571 went on to win Rookie All-Star and compete in the world championships. The team also started Team 4365 who proceeded to win the Engineering Excellence Award at the Smoky Mountains Regional.

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

Regarding FLL, 3824 has started 8 teams which have impacted approximately 72 students. Several team members, as well as alumni, have helped mentor these teams. Additionally, the establishment of the Knoxville FLL Qualifier Tournament, which is hosted and run by 3824 members, has resulted in an explosion of FLL teams in the Knoxville Area. The team has also started two FTC teams, Team 11675 out of Hardin Valley Academy and IGS Robots, located in Germany.

### Describe the team's initiatives on assisting other *FIRST* teams (including Jr.FLL, FLL, FTC, & FRC) with progressing through the *FIRST* program

Team 3824 has assisted three FLL teams over the past five years monetarily and witnessed students "graduate" from the FLL program to the FRC program. This year is the team's first foray into the FTC world by assisting two teams: the team at Hardin Valley Academy and the Team from Georg-Christoph-Lichtenberg Gesamtschule.

**Describe how your team works with other *FIRST* teams to serve as mentors to younger or less experienced *FIRST* teams (includes Jr.FLL, FLL, FTC, & FRC teams)**

In the past five years, 3824 has mentored six FLL teams; two of which were mentored in collaboration with FRC 3140 team members. To support IGS Robots, the FTC team the RoHAWKtics started in Germany, 3824 started a sister team in the US and mentor the German team via Skype and email. However, 3824 is actively reaching out to other FRC teams to gather support for the rising number of FTC teams in Germany through involvement in the exchange program founded in 2015.

**Describe your Corporate/University Sponsors**

3824's sponsors are primarily technology centric corporations and government entities. Many of our sponsors are supporting companies, such as Bechtel, who work with our primary sponsor, Oak Ridge National Lab. In addition, Knox County Schools, 3824's school system, contributes support as well.

**Describe the strength of your partnership with your sponsors with special emphasis on the 2016/2017 year and the preceding two to five years**

3824's close relationship with their sponsors has opened up opportunities to give demonstrations to spread FIRST ideals. TVA has provided these opportunities to the team. ORNL has given 3824 opportunities to work in lab facilities. As the team proved their proficiency in STEAM, The Department of Energy opened up a variety of internships and potential career opportunities to 3824 team members, and other FRC team members at ORNL as well as across the country.

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

FIRST is an organization, sport, community, and family that allows people to grow and blossom in a safe environment. FIRST is an organization that brings technology to students worldwide. FIRST is a sport that builds interpersonal and leadership skills in participants. FIRST is also a community where people are willing to help others through any trial or tribulation that arises. Finally, FIRST is a family that is always there even after build season.

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

3824 mentors often join the team with their children, then become inspired to continue mentoring after graduation because of their belief in FIRST ideals. 3824 alumni are returning to FIRST to mentor FRC, FTC, and FLL teams. The team is excited to see a new FIRST alumnus start an FRC team at a high needs high school this year. This passion stems from a side by side mentoring approach which gives EVERY student a voice.

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

Rowan Palmer

**Essay**

Stay Focused-

While 3D printing is part of 3824's DNA, this team is more than that. The RoHAWKtics prides itself on involvement in the local community, demonstrating and teaching about FIRST, and global outreach. The team strives to always embody the FIRST mentality. The RoHAWKtics depend on community support to operate. Therefore, whenever an opportunity to give back to the community arises, 3824 seizes it. FRC 3824 is dedicated to serving its community and its members.

Stay Hungry, Stay Humble-

The HVA RoHAWKtics have been pioneers in innovative technology since its founding year in 2011, which required it to delve into 3D printing technologies. Since then, the team has expanded its reach with this technology and has recently explored implementing the pultrusion process into robotic development. As the team's home school, Hardin Valley Academy, does not have a machine shop, the resources available to 3824 in its Rookie year were vastly limited, forcing the team to explore 3D printing amongst other innovative solutions. The experience the team gained that year led it to expand use of 3D printing in later FIRST seasons. The 2014 robot, the "Black Lotus," had an entirely 3D printed chassis. This was not only a feat for the FIRST community, but for additive manufacturing also. It proved the capability of 3D printing to be used in large scale manufacturing. This specifically inspired Local Motors' "Strati," the first 3D printed car. 3824 has not stopped there. The intensity of FIRST Stronghold influenced the team to move away from 3D printing and led it to implement the pultrusion process in its robot's chassis. Pultruded fiberglass, while not new to FIRST, is still relatively unpopular throughout the robotics community despite its durability. Now in its 7th year, 3824 is not only using ingenuity in design, but also in the quest to spread STEAM education.

Stay Engaged-

Stay Engaged With the Student Body:

Hardin Valley Academy is unique in that its student body is divided into learning groups or academies (Business, Law & Public Affairs, Health Science, Liberal Arts, and STEM). Despite this separation between students, Team 3824 strives to unite students through the robotics team, ingraining itself as an integral part of the school's culture, and providing students from all backgrounds the opportunity to explore STEAM related fields in a team environment. It has accomplished this through its presence at various school functions, such as football games and Valleypalooza.

Valleypalooza serves as a student's first introduction to the team and the school, occurring before the start of a new school year. There, the team is present with information and a promobot that plays a role as a t-shirt cannon at sporting events. Its presence intertwines STEAM education with athletics in a creative and purposeful way. The team has used its influence garnered through these school wide events to make an impact in the world. Team 3824 has collected donated glasses and calculators from the student body to send to a local optometrist, Dr. Lane. He works with an organization in Ghana that distributes the donated supplies amongst those who would otherwise not have access.

Stay Engaged with Children's Charities:

Team 3824's impact expands from its student body to the local community through its involvement in fundraising for East Tennessee Children's Hospital. Members participate in a fundraising event for ETCH where various organizations decorate a tree for auction. Team 3824 decorates a tree annually with 3D printed ornaments designed by members on the team. In addition to providing a tree, the team provides volunteers who primarily assist in running the children's booths.

Stay Connected-

Stay Connected with Elementary Students:

Team 3824 strives to spread FIRST and STEAM education to students with the potential for involvement in FIRST, and on a larger scale, STEAM. To achieve this, 3824 assists in running the Engineering Day at Two Blues STEM Camp, a technology summer camp catering to 70 elementary students annually. In addition to being heavily involved in the Engineering Day, the team provides volunteers to staff the camp for the entire week it runs. This provides campers a solid and captivating introduction to STEAM; in addition to STEM camp, Team 3824 annually hosts and runs a state qualifying FLL tournament. The establishment of this event has been integral to the growth of FLL teams in the Knoxville area, for which the tournament served as a catalyst, effectively inspiring future engineers and scientists.

Stay Connected with the Community:

Team 3824's impact on the community is not limited to the Knox County School System. Oak Ridge National Laboratories has allowed it the opportunity to be present at the campus' Bring Your Child to Work Day. This enabled the team to not only assist one of its sponsors in carrying out an event, but to also introduce the various levels of FIRST to families who had previously not been exposed to the program. The team further promotes FIRST through their participation in the Farragut Fourth of July Parade, during which the team displays its robots on a float and provides information pertaining to FIRST to over 10,000 people annually. Through this event, 3824 hopes to generate interest in STEAM throughout the local community. Another way to accomplish this is through involvement in a local Maker Faire. To ensure the event's success, members assist in running it, while also demonstrating their robot, effectively generating interest in a variety of technologies. To further promote culture of Coopertition® throughout the local FRC community, the team hosts Lunch & Learn. Local teams meet on Saturdays during build season for lunch and to discuss build progress. This time is often used as a way to discuss problems teams may be having and receive assistance from other attending teams. Safety presentations are given by a team's safety captain to further promote a safe culture.

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Stay Connected with Professionals:

3824 values corporate opportunities that allows it to demonstrate business and engineering practices. Several corporations in the Knoxville area have provided this opportunity to the team. One such corporation is ALCOA Advanced Manufacturing. The team demonstrated to the board of ALCOA the benefits of FIRST robotics and capabilities of the local FRC teams. The Tennessee Valley Authority also provided the team an opportunity to demonstrate the capabilities of its 2016 robot, Pultruder. TVA and ALCOA are leading STEM employers in the Knoxville region, and demonstrations such as these allow students to network with potential future employers. The RoHAWKtics demonstrated 3D printing abilities during the kickoff of the government initiative called

America Makes. This initiative was created in order to jumpstart additive manufacturing in the US. Multiple corporations, universities, and government officials including President Obama's economic advisors and the Secretary of Commerce witnessed what the team had accomplished with this technology. On the local front, 3824 shared its robot with approximately 2,000 people at Robotics Revolution, a robotics exhibition event. During this event members engaged with younger FIRST members and students interested in STEAM. ORNL, another large employer in the area, allowed the team to inspire students on a more personal level. A group of Japanese middle school students came to the lab where they were introduced to advanced additive manufacturing from team members. Nighthawk, a promobot that was built with advanced additive manufacturing, dazzled the students. The team has shared the spirit of Coopertition® not only with this group of students, but thousands across the nation.

Go Global-

Go Establish:

There are no FRC regionals in Europe, and only one established team in Germany. In an effort to remedy this, team 3824 established relations with Georg-Christoph-Lichtenberg Gesamtschule, a school based in Göttingen-Geismar, Germany, in 2015, setting the foundation for the first robotics based school-to-school exchange program out of the United States. Six students from Georg-Christoph-Lichtenberg Gesamtschule traveled to Knoxville, TN, where they stayed with members of the team and participated in the meetings surrounding the Smoky Mountains Regional. Team 3824 later sent students to Germany, with the intent to introduce ?FIRST to the community. The team was successful in establishing a FTC team within its partner school, and they have continued to mentor the team via Skype and email.

Go Forward:

Having received blessings from ?FIRST, Team 3824 plans to continue the foreign exchange; however, the program's success requires support from other FRC teams. In 2016, the team presented at the world championship on the exchange program. To ensure sustainability, the program will transition from an annual to a biannual exchange. This allows for the program model to be easily adopted by other FRC teams, as it is more fiscally viable and reduces the amount of stress involved in organizing the exchange. Though a relatively new venture for the team, the German exchange program is rapidly ingraining itself as a part of the team's DNA.