



TROJANATORS 5740





Dedicated to Woodie Flowers

"Competition for the sake not of destroying one another, but for the sake of bettering and improving both competitors as a result of the competition." -Woodie Flowers



FRC TEAM 5740
TROJANATORS 2022
NON-TECHNICAL BOOKLET

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DEEP SPACE

DEEP SPACE

5740

TEAM INFORMATION



TEAM FOUNDATION

MISSION:

To build students of creativity, leadership, and professionalism - connecting them to a future enlightened by their STEM experiences.

VISION:

To see our communities served by our team members, equipped with gracious mindsets and professional skill sets.

TEAM FOUNDATION:

5740 was founded to create STEM opportunities within our community.



5740 BY THE NUMBERS

Teams we started and/or mentored:



30
students

10
mentors

100%
of outreach is student
executed.

IN-REACH

5740 In-Reach refines our students' technical skills prior to build season. Sessions are taught by our mentors and student leads, twice a week for 6-8 weeks. This year, we focused on CADD and Software skills. In-Reach allows us to work with purpose and increased efficiency and grow the skills of our new team members.



**CADD
In-Reach**

**Software
In-Reach**

LEADERSHIP STRUCTURE

Technical Leads



Mechanical
Benjamin Bollman

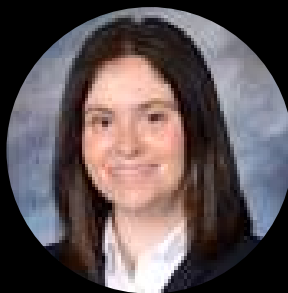


Control Systems
Ellison Armitage



Control Systems
Lauren Gayle

Non-Technical



Non-technical lead
Katie LuPone

TEAM AWARDS

2015

Rookie Inspiration award

2016

Verizon App Challenge

2017

Dean's List Finalist

2018

Engineering Inspiration
\$100,000 Kahn Family Foundation Grant

2019

Dean's List Finalist
Dean's List Award Winner
Engineering Inspiration

2020

Chairman's Award

2021

Dean's List Finalist
Chairman's Award

FAMILY SPONSORS

Caldrone Family
Jim and MaryAnne Jordan
The Culley Family
Armitage Family
Sue and Al Feczko
Feczko Family
Huba Family
DPL Engineering
Schubert Family
Claassen Family
Warners Family
Peterson Family
Garbulinski Family
Hufnagel Grandparents

CORPORATE SPONSORS

Where Eagles Dare LLC
Cranberry Dental Studio INC
Total Equipment Company
Ridge Insurance Agency
Edward Jones
Lightspeed Business Consulting
Jeremiah Bondra DMD
DPL Engineering
Ellwood City Hungarian Home
William A. LuPone Jr. and Associates
Fitzsimmons Metal Inc
Karski & Spokane Orthodontics
Insurance Consultants of Pgh.
PAG Pennsylvania LLC
GKG Ortho
BD Volunteer Match Dollars
BD Direct to Charity Matching Gift
Keelan Dental
Weist Asphalt
Grant Street Group

SPONSOR RELATIONS

We have held summer picnics to thank our sponsors for their donations to the team. They were able to meet the team, see our warehouse, and drive the robot!

We have transitioned our sponsor appreciation to inviting our sponsors to regional events where they can meet the team, experience a FIRST event, see the robot in action, and leave the competition with 5740 merchandise.



ALUMNI TODAY

Our 42 alumni stand out and are making a difference!



Examples Include:

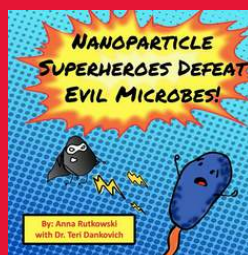
Anna Rutowski (2017) published a book called "Nanoparticle SuperHeroes Defeat Evil Microbes".

Matthew Esser (2018) has begun research at OSU, he still assists with FRC 5740's awards.

Sophia Wiest (2018) is working diligently to start FIRST teams near Penn College.

Thomas Franco (2020) has begun research as PSU and has gained many internship opportunities because of his FIRST experiences.

Peyton Jones and Gavin Krebs (2021) have followed the FIRST pipeline to Kettering University



10





The logo of St. Catharines Catholic High School is a circular emblem. The outer ring contains the text "ST. CATHARINES CATHOLIC" at the top and "HIGH SCHOOL" at the bottom. The inner circle features a central figure, possibly a religious icon, surrounded by a decorative border.

Curriculum & Career Development

CURRICULUM IMPACT

9
STEM
Electives

500+
Students
Involved

- AP Computer Science Principles
- Engineering 1: Introduction
- Engineering 2: Engineering by Design
- STEM Choice
- Introduction to Electronics
- Honors Intro to CADD
- FIRST Class Robotics I
- FIRST Class Robotics II
- Into to Computer Science

STEM CLASS

5740 inspired the development of a STEM Choice Class, where students can customize their STEM experiences

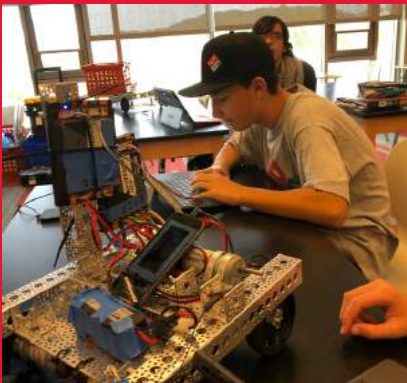
FIRST CLASS ROBOTICS

FIRST Class Robotics I:

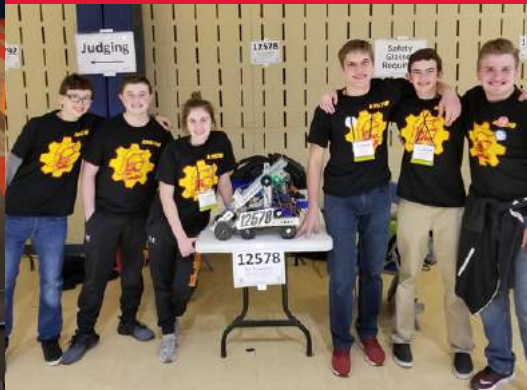
An project-based course designed to work in parallel with the FIRST Tech Challenge robotics competition on FTC 12578. Students are divided into sub-teams based on interest. Co-curricular approach provides FIRST opportunities.

FIRST Class Robotics II:

Offered to students who will serve as sub-team leads. Students are directly responsible for project management. They create schedules, delegate tasks, establish accountability, and oversee the design cycle.



60+
Students Involved



CAREER DEVELOPMENT

40+

**Career Development
Opportunities**

500+

Students Involved

Field Trips and Career Action Plan (CAP) Talks

Includes local businesses and sponsors,
allowing the student body to explore STEM
careers and industries.

PURPOSE:

CAP Talks and Field Trips allow the student body
to learn valuable knowledge from industry
professionals. Many speakers are
representatives of 5740 sponsors and even
mentors!



CAREER DEVELOPMENT



3

Students have been hired by our engineering sponsors as employees in various capacities.

5740 partners with Point Park University's Wood Street Communications and Rowland School of Business to provide our students with college level mentorship.

INTRODUCTION TO STEM

3 women from 5740 attended a Westinghouse Women in STEM Day. The female engineers explained the branches of engineering and female role models in the industry. The students also toured the nuclear engineering training facility and were taught about the training process. Finally, there was a Q&A panel with the female engineers so the students could obtain a better understanding of their roles in engineering.



" I really enjoyed the STEM day and learning from these female engineers. I now have an expanded understanding of the engineering fields & it now guides my career outlook." - Katie LuPone







SERVICE
THROUGH STEM

TOY ADAPTATION

In Summer 2019, we kicked off our toy adaptation project, where 5740 students utilized their technical skills to adapt toys for medically fragile children. These toys provide opportunities for children to play by removing the need for dexterity and fine motor skills, making them developmentally appropriate for any skill and ability level. We donated the toys to The Children's Home & Lemieux Family Center where they are available to over 40 children on a daily basis.

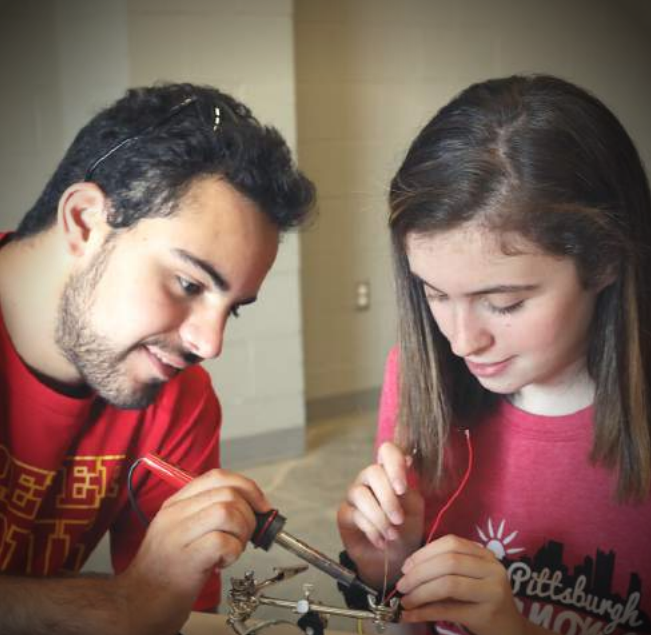
28

Toys Adapted

\$3,200 Invested

**\$1200 sponsored by our team Boosters
and \$2300 raised via an all-school
fundraiser.**

"Toys like this are not only expensive, but very hard to come by; and we truly appreciate their hard work to make sure our patients get the most from development through play. They really spread a special kind of joy to our children here," - Pam Keen, CEO of The Children's Home & Lemieux Family Center.



SENIORS FIRST

Visited

5

Different Senior Living
Communities

200+

Residents Involved



5740 shares our FIRST and STEM experiences with the residents and we are currently making plans to connect other FRC teams to the initiative state wide.

"As a 1955 graduate of North Catholic, I was proud to attend the NC Robotics presentation at Sherwood Oaks. We certainly didn't have anything like it when I was a student. As a Pitt Engineering graduate with a B.S. and M.S. in Metallurgical Engineering I am always pleased to see the STEM courses being emphasized. The residents loved the program and especially the one-on-one technical help from the students." - Frank Weiss

STEM CAMPS

MORE THAN ROBOTS:

Teaches FRC basics: CADD, construction, electronics, programming, business, and awards.

Promotes teamwork and Gracious Professionalism.

4

YEARS

80+

KIDS

ARDUINO

CAMP:

Our software team taught these campers the basics of coding and electronics. The campers focused on learning Arduino controls.

Summer at

North Camp:

Our Team helped provide part of the programming for the camp. The campers learned basic coding and design skills.

STEM CAMPS

WOMEN IN STEM CAMP:

5740 hosted a Women in STEM Camp at Berner International's facility in 2018, a sponsor of 5740 for 4 years. We used Berner air curtains to teach the girls the science of hurricanes!

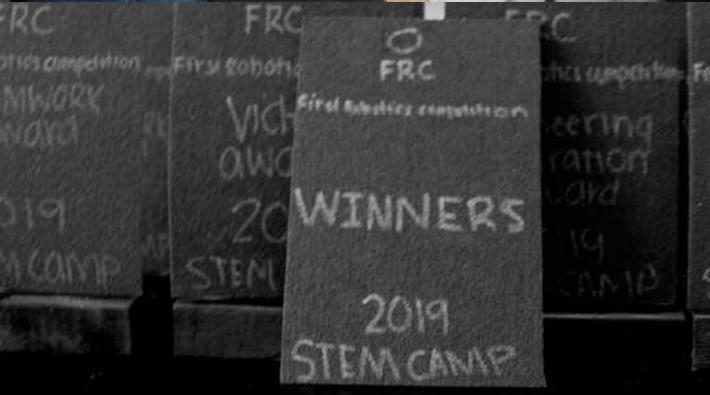
25 CAMPERS

The STEM camp was a collaboration with the former CEO, Georgia Berner.



"I never realized STEM was an option until hearing the speaker's stories. I thought it was for boys, but I think I might want to try it out..."

(A. Horvath, camper)



SCHOOL INVOLVEMENT

Since 2015, 5740 has run a robotics table at school open houses in the fall and spring for families interested in North Catholic. We introduce them to the FIRST Program and share team history and personal stories.



We also demo our robot at Scarlet and Gold Day where 8th graders in the community come to North Catholic to experience a day as a high school student.

CHRISTMAS ON TROY HILL

Since 2017, 5740 has brought robots to an underserved Pittsburgh area. Every December, the school assists these families on Troy Hill with gifts and provides a warm meal.



We brought our FRC robot and gave kids the opportunity to test drive the robot. We created a friendly competition style game and gave out small prizes to every participant. We also ran a button station for the kids to make custom buttons to take home.

INCLUSIVE GAMES

In 2019, team 5740 participated in the Inclusive Games hosted by St. Anthony's School Programs.

For over 65 years, St. Anthony School Programs has been helping students of all faiths with intellectual disabilities to live their lives to the fullest academically, socially, vocationally, and spiritually.

The Inclusive Games was inspired by the Special Olympics. It pairs students in the program with their peers to compete individually, with the school, and with other St. Anthony Program sites. This promotes camaraderie, teamwork, good sportsmanship, and school spirit.



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MONTESSORI

On Valentine's Day, we brought FIRST concepts to a pre-school! We demoed LEGO Boost and explained how fun robotics is. We read them stories, used LEGO Duplo to build a train track with a color sensor, and made custom robot stickers with the children, for them to keep.



STEAM Carnival

In October, 5740 participated in the STEAM Carnival Education Day at The Pittsburgh Children's Museum!

1,000+ people

were in attendance!



We demoed the robot at our tent and let the children operate the robot. The kids also played with LEGO BOOST and Mindstorms robots to show multiple levels of FIRST.

FIRST AWARENESS

Mars New Year:

5740 has demoed for FIRST and the Mars New Year community event. The town of Mars celebrates the planet Mars's new year with science and alien activities. FLL and FRC teams from the area demo their robots to the crowd, host fun games, and let the kids drive the robots.

8,000+ People Attended

The Mars School District is working on building a STEM building in the town and has obtained sponsorship from NASA. This building would be available to all FIRST teams for tools and field space.



FIRST AWARENESS

Boy Scouts:

We demoed FIRST Robotics to the Boy Scouts with FRC 4049 where we talked to the scouts and let them drive the robots.



In October, 5740 attended the STEM Fest at Robinson Mall to demo the robot. This event had

1,000+ attendees



FIRST AWARENESS

Girl Scouts:

We hosted a STEM learning experience for a troop of Girl Scouts. We helped the Daisy & Brownie troops earn their robotics badge.



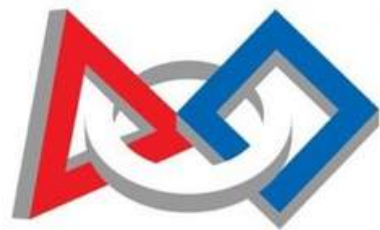
A girl scout was asked if she was interested in robotics & she said “no way”. After the program, we asked the troop if they would be interested in joining robotics & the same girl scout was the first to raise her hand with much enthusiasm.

FIRST AWARENESS

Mask Initiative

We created a mask initiative to bring masks to local healthcare facilities. We fabricated over 1000 masks. A foreign exchange student used our mask fabrication manual to get 300+ masks donated in Thailand.

#FIRSTfightsCOVID

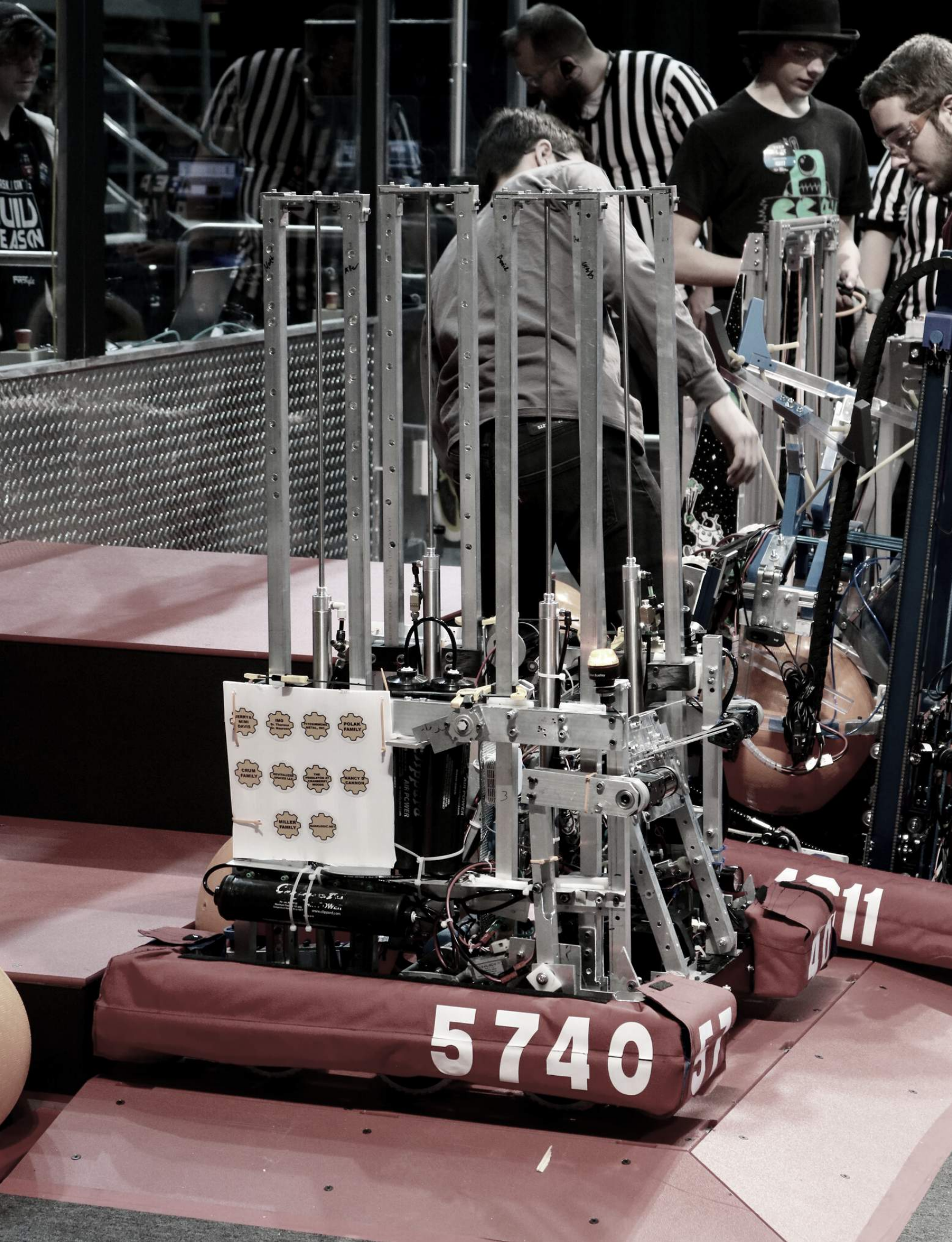


FRC BOOTCAMP

Over the past 2 FRC seasons, we have invited local FLL teams and students interested in STEM to visit our warehouse for FRC Bootcamp.



Students help us manufacture our parts on their first day of camp. They return a week later to see the finished robot and receive a 5740 t-shirt! Then they return for a third visit to drive the robot!



KERRY MINE DAVIS
BOB S. THOMPSON
POLAR FAMILY
CRUM FAMILY
THE OPERATING SYSTEM
NANCY O. CARSON
MILLER FAMILY

5740

11

FIRST EXPANSION

FIR

FLL JR. IN BUTLER

In 2017, we wanted to spread FIRST to local school districts in our area. We started with Butler, an underprivileged area in our community. The kids loved STEM and FIRST culture, the superintendent acted on this to make a STEM Initiative. Our 2 FLL Jr. Teams, 10999 and 13967, prompted the superintendent to implement STEM curriculum in every grade level.



"None of this would have happened without 5740's interest in our school" - Michelle Crilley, Butler FLL Jr. director and teacher

FLL: PATHWAYS TO INSPIRATION

120+
students



10 FLL
Teams

We brought FLL to our local grade school, St. Kilian. We hosted FLL training days in the fall and spring so the kids could experience FIRST and FLL which evolved into a full program. We also went to St. James and worked with their FLL Teams on assisting them with their mechanisms.



We wrote grants with FRC 599 to create 10 FLL teams in Grenada Hills, California based on our FLL model.

FLL: PATHWAYS TO INSPIRATION

We ran an FLL Tournament called the Terrific Trojanator Tournament in 2018 and 2021. We provided design tips and assistance to the teams.



25 Teams



FTC: FAR AND WIDE

4 Programs

FTC Trojanators 12578
Aquinas Academy 14427 - Gibsonia, PA
Bison Tech 14444 - Erie, PA
ACE Robotics 15430 - Desert Mountain, AZ

1
Inspire Award



1
Event Win

We have provided technical and non-technical aspects to these teams!

2 Workshops
for 5 FTC
teams



We helped these teams to learn all about the basics of FTC and provided design, strategy, and game play tasks for a successful competition.

FTC: FAR AND WIDE

We collaborated with FRC Team 6314 to create FTC Team 15430 using our FTC Class structure.

"5740 is a model team for us. They answer questions and assist us with sustaining our team in the long run!" (Jake Okun, FTC 15430).



5740 ran the only kick-off in Western PA in 2018. Our FTC efforts evolved to an official scrimmage hosted in 2019 where 16 teams attended and competed with 300+ visitors.

FRC: COMING FULL CIRCLE

After partnering with FRC Team 6814, a team we mentored in their rookie year, we created Full Circle (FC), a program with resources on the FC website and direct mentorship, providing daily check-ins and frequent calls on Discord to assist teams with fundamental FIRST concepts.

FullCircle 

10
original
articles

83+
Teams in China received these
articles translated through the
F&D Studio Partnership

These articles consist of Team Culture, Outreach, Rookie All-Star, Leadership Structure, Culture Tips, Branding, Fundraising, Intro to Command-Based Programming, Electronics, and Mechanical Design.

FRC: COMING FULL CIRCLE

Success of the 2019 FullCircle Teams

- 7416 (New Hampshire)
- 7427 (Georgia)
- 7461 (Washington)
- 7475 (Ontario, Canada)
- 7528 (California)

- 7651 (New York)
- 7728 (Florida)
- 7851 (Kyiv, Ukraine)
- 7902 (Ontario, Canada)

Rookie All-Star:	6
Highest Rookie Seed:	4
Competition Winners:	2
Rookie Inspiration:	1
Excellence in Engineering:	1
Judge's Award:	1

FRC: COMING FULL CIRCLE

2020 FullCircle Teams

- 8016 (California)
- 8019 (Texas)
- 8053 (Texas)
- 8159 (Istanbul, Turkey)

- 8232 (Indiana)
- 8240 (Istanbul, Turkey)
- 8293 (Jalisco, Mexico)
- 8296 (Ontario, Canada)
- 7636 (Chinese Taipei)



FRC: INNOVATION IN COMMUNICATION

5740 created and continually moderates the FRC WOW Discord for teams from around Western Pennsylvania, Ohio, and West Virginia. The server promotes collaboration and communication amongst teams, and helps friendships form between different team members.

275+
members

66
teams



5740 utilizes our team members' unique talents and skill sets through our WOW-Region Podcast, Inside FIRST. Podcast episodes are uploaded to YouTube. The podcasts are 100% student-run and discuss everything FIRST from a student's perspective.




FIRST

Pennsylvania
Advocacy
Conference of
Technology





NORTH C

POLITICAL ADVOCACY

PACT

Founded by 5740, The Pennsylvania Advocacy Conference of Technology (PACT) advocates to legislators for increased STEM education funding and the promotion of after-school STEM programs within our state, with specific focus on the PASMART funding bill.

Before our efforts, Pennsylvania was ranked #48 in STEM education. It now ranks #2 in the country with \$30 million from PASMART. We met with state representatives, with the goal of persuading the representative to advocate for STEM funding at the state level.

Every representative we met with voted "**Yes**" for the PASMART Bill

"Your communication to legislators led them to increase STEM funding in the PA budget [by 30 million]"

-Daphne Frownfelter, FIRST RD

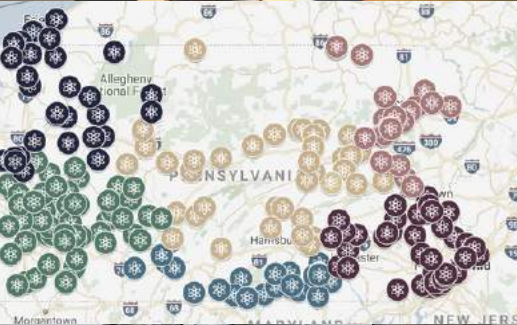
PACT

"Your organization is going to make a better Pennsylvania. I'll contact Harrisburg and see how we can do something similar to Michigan [for FIRST]"

-Representative Dermody

At the 2019 Greater Pittsburgh Regional we hosted a PACT informational meeting for teams to attend. Alongside our regional director, Daphne Frownfelter, we discussed the meaning of PACT, PASMART, and Advocacy. We stressed the importance of advocacy to the attendees and explained how we will be approaching school boards as our next step.

Mr. Judd Pittmann, the Special Consultant to the Secretary of Education on STEM at Pennsylvania's Department of Education, created the foundation of PASMART and was in attendance at the 2019 Greater Pittsburgh Regional! He spoke during the opening ceremony with Ms. Frownfelter, and following the ceremony we talked to him about PACT and PASMART.



FRC 5740 - THE TROJANATO

PACT

ADVOCACY CONFERENCE 2019

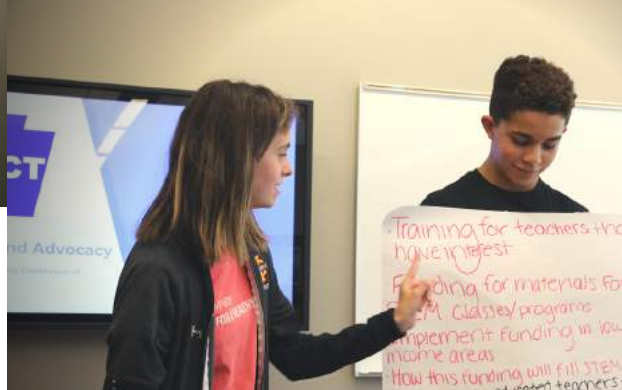
August 24, 2019
10:00-3:00

NORTH CATHOLIC HIGH SCHOOL
1617 RT. 228
CRANBERRY TOWNSHIP PA, 16066

ALL FIRST ROBOTICS TEAMS FROM ALL STATES ARE INVITED TO ATTEND OUR ADVOCACY CONFERENCE. ATTENDANCE IS FREE AND LUNCH WILL BE PROVIDED.

TOPICS INCLUDE:

- HOW TO BUILD CAPACITY FOR NETWORKING WITH REPRESENTATIVES AND SCHOOL BOARDS
- HOW TO ADVOCATE FOR STATE



PACT

We have made incredible strides with PACT and Advocacy since the passing of PASMART in the fall of 2018.

765

Schools have benefited from PASMART

In August, we held a workshop to teach 2 other teams about PACT, PASMART, and modeled how to advocate to their representatives. The President of the Deer Lakes School Board, Bill LuPone, presented at the workshop. He spoke about the importance of advocating to schools for increased STEM funding.

We met with Deer Lakes School Board, a recipient of PASMART, to discuss the utilization of their grant funding. Deer Lakes recognized that the PASMART Bill had several restrictions. This spring, we plan to meet with more schools to address these needs and to continue to advocate for PASMART reform.

In late fall of 2019, the state added \$10 million to the PASMART grant pool and loosened restrictions on how to spend the money!

PACT

There has been great progress and success since the passing of PASMART - The Philadelphia Robotics Coalition received **\$150,000** to create **200** FLL Teams!

Examples of Targeted Grants

Bradford Area School District received \$35,000 for expanding computer science programs, focusing on the elementary school level.

Seneca Valley received \$35,000 to expand their FTC robotics, coding, and AI programs.

Deer Lakes utilized their money to train faculty for their BotsIQ program and STEM classes. They have hopes to soon utilize many machines in their classroom, they were not able to use these machines in recent years due to budget cuts.

State Advocacy Summit

On February 15th 5740 presented with 6 other FRC teams through FIRST Updates Now. This broadcast allowed us to present how we effectively advocate and how others can begin advocating in their own states. This broadcast will remain on the FIRST Updates now channel and has been viewed by over 200 people thus far.



TRETC CONFERENCE

In October 2019, we presented PASMART and PACT at The Three Rivers Educational and Technology Conference, as part of a student showcase. We spoke with administrators and educators about FIRST, demoed our robot, and explained the PASMART Bill and its use for FIRST and STEM education.



We presented at TRETC again in 2022, about making connections with industry professionals. We used our team as a case study to show “How many connections it takes to build a student”. We advocated for programming within schools to follow FIRST’s model for mentorship. We characterized connections as Touch-point Partnerships, Meaningful Mentorship, & Authentic Apprenticeship.

2022 TRETTC Talk Summary

CONNECTING STUDENTS TO INDUSTRY PROFESSIONALS

TEAM 5740 - FIRST ROBOTICS CASE STUDY

SESSION OBJECTIVE:

- EDUCATIONAL LEADERS WILL DEFINE, IDEATE, AND APPLY BEST PRACTICES FOR CONNECTING STUDENTS TO INDUSTRY PROFESSIONALS.

IN FIRST ROBOTICS:

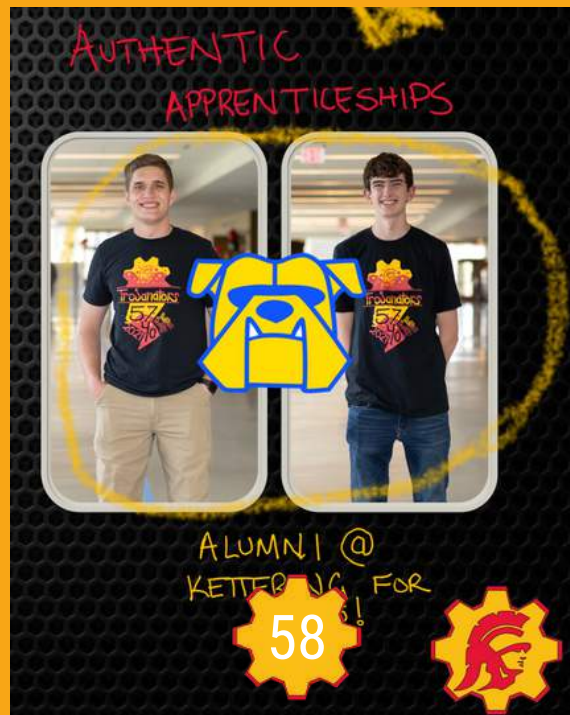
- VOLUNTEER PROFESSIONAL MENTORS LEND THEIR TIME AND TALENTS TO GUIDE EACH TEAM.
- THIS MODEL IS MIRRORED IN OTHER CURRICULAR, CO-CURRICULAR AND EXTRA-CURRICULAR PROGRAMS AND IT IS WORTH EXPANDING THESE EFFORTS – **HOW COULD WE DO IT?**

WE OUGHT TO CONNECT OUR STUDENTS TO INDUSTRY PROFESSIONALS IN THE FOLLOWING WAYS:

- TOUCH-POINT PARTNERSHIPS
- MEANINGFUL MENTORSHIP
- AUTHENTIC APPRENTICESHIP



TRETC Student Showcase



FOREVER TRUE PLAN

To show sustainability and expansion of our efforts, our team compiled a plan of action and we will complete the following goals by 2024.

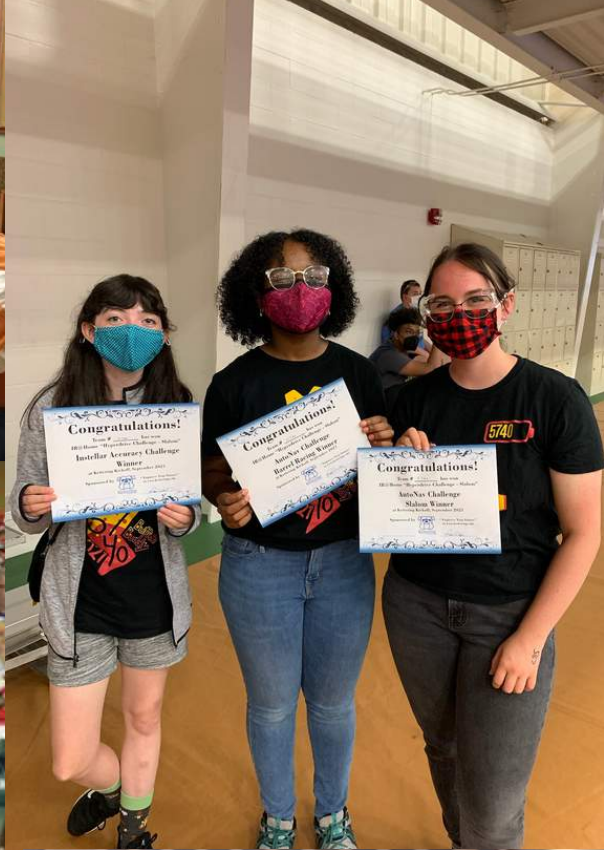
- Host an official FRC Kickoff and FTC Qualifying tournaments/events.
- Host an annual off season FRC event for WOW.
- Increase local FLL mentorship to 20 teams.
- Create sustainable FIRST programs at all 9 school districts in Butler County through PACT and PASMART funding.
- Expand FLL Jr. teams and events in our local community.
- Use Seniors FIRST to bring STEM awareness to 15 senior living communities with other FIRST teams across the state.
- Further expand career development opportunities for North Catholic students.
- Continue FIRST expansion in Europe and Asia.

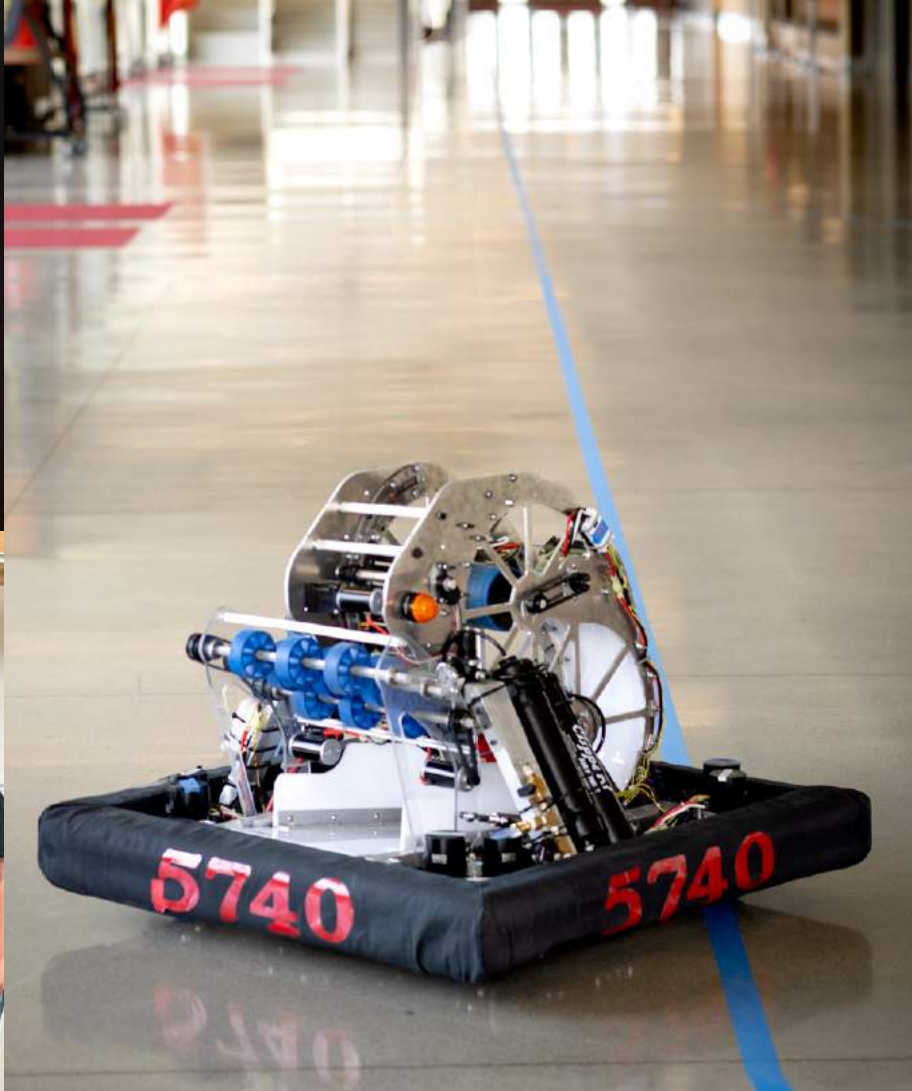
5740 IS...



Above is a word cloud, where students were asked to describe 5740 in one word

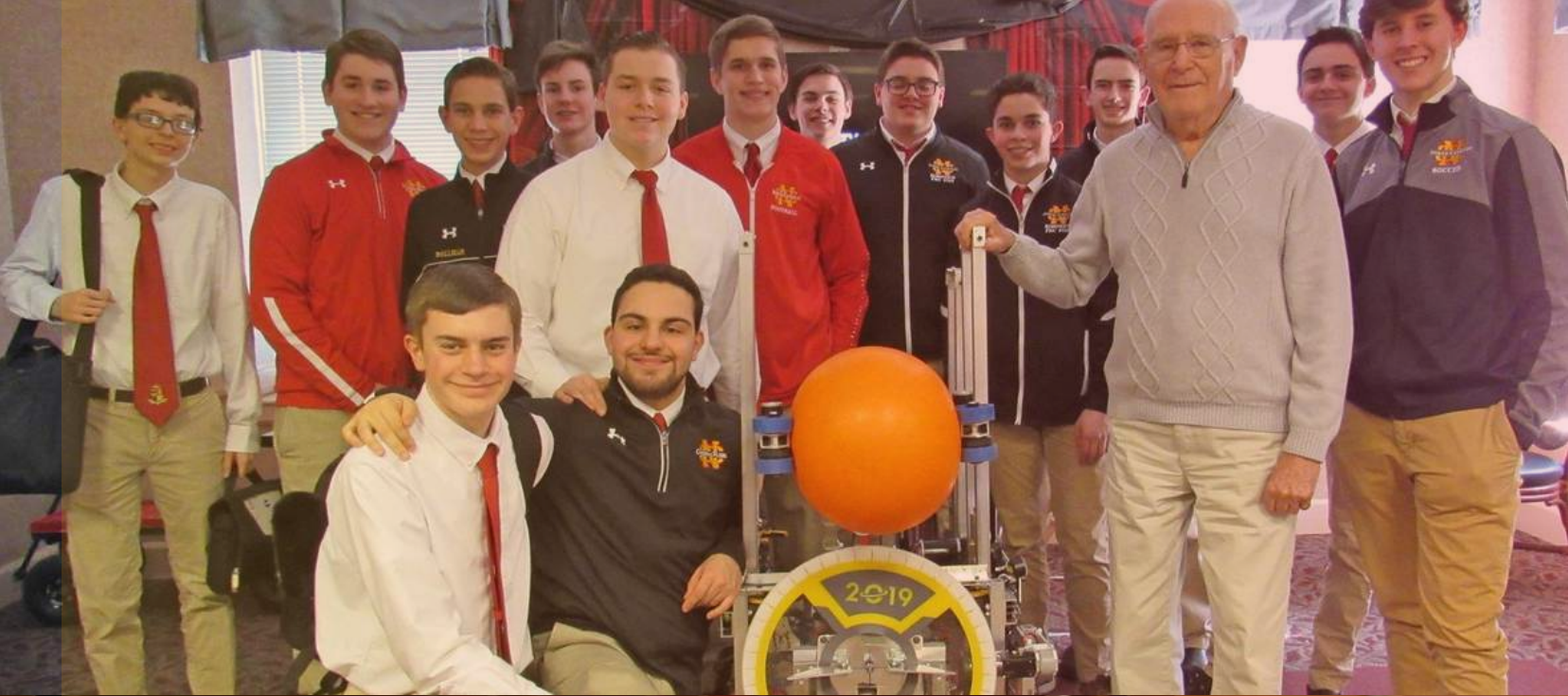






Robo-prom is epic





Some of our NCHS Alumni



THANK YOU!

THANK YOU **North Catholic High School** for supporting our Mission.

Mentors and Parents, THANK YOU for contributing your time, knowledge, and expertise. We appreciate all that you do!

THANK YOU to our **Sponsors!** We appreciate your generous donations and in-kind contributions, which allow us to build a robot and operationalize our team.



WE ARE ... NC!