



4499 The Highlanders Engineering Inspiration Team Attributes



Team History

1. 98% students who peruse higher education go into STEM degrees, with 97% of team members go on to 4-year college.
2. 72% of our alumni are active team mentors, over 35% receive scholarships and 97% peruse STEM careers.
3. Team members, alumni and parents of team members or alumni volunteer at 136 events, many of which hold leadership roles in these events like head judge for FLL events, FLLC and FTC Head Ref for the State of Colorado, and Regional Judge Advisor for FLLC in the past 3 years.

2022 Programs (new for 2022 season)

- Colorado FIRST
 - 3 Informational videos *
 - Assist 8 virtual tournaments by suppling referees, judges, program organizers, promotional videos, and run awards ceremony.*
 - Custom FIRST virtual backgrounds*
- Mentorship Program
 - Assisted 4 FRC teams with machining, shop, resource and other help *
 - Mentored 3 FLLC teams; assisted 5 FTC teams with machining, design, assistance with the innovation award and helped 18137 rebuild part of their robot when destroyed in Boulder fires when their tournament was days away. *
- FRC collaboration initiatives
 - Shop Talk - Discussions and support calls each week for all FRC teams in Colorado in the Colorado FRC Discord Channel. *
 - Drop-In Shop Days - We opened our shop to 10 teams to build, practice and just hang out (and enjoy root beer floats) *
 - The 1st annual CAD-A-Knack submission where we had Colorado FRC teams submit their team's logo where the best one we laser cut out and sent to the team. *
 - Share the Resources –Opened our shop and equipment all 35 FRC teams in Colorado to have access to our machines, supplies and resources.*
- Diversity plan *
 - The Highlanders are committed to an environment at work that promotes for diversity amongst team members and assists students in balancing robotics and family. See the full plan on our website: <http://highlandersfrc.com/DiversityInclusion.aspx>
- VRUM / MIRV
 - VRUM – the team built a mobile application that notifies on-coming vehicles of pedestrians to prevent vehicle incidents. This application went on to be shared with USDOT to save the lives of road construction workers, bicyclists, and pedestrians. *
 - MIRV – The Highlanders are creating a Multi-Incident-Response-Vehicle (MIRV) robot to place traffic flares and reroute oncoming traffic around a vehicular accident. This system will help to mitigate traffic impact and ensure motorist and first responder safety for the duration of the accident. 82% of current Highlander students will gain professional work experience and apply their knowledge from The Highlanders in this real-world situation via an internship with Nearea Consulting this summer.*
- Grants
 - \$25,000 grant donated by Nearea Robotics to fund program, assist outreach programs to support STEM outreach assistance.*
 - \$150,000 grant from USDOT to complete the MIRV project and create internship positions for Highlander students to create an innovated autonomous robot test vehicle for making roadways safer.*
- KILTS (Kits that inspire Leadership and Teamwork in STEM)
 - Created 5 new science experiments and developed 150 new individual kits.*
 - Visited Horace Mann in OK and donated 18 kits*
- Rocky book series
 - Created version 5 of book series, “Rocky Goes to Scotland” *
 - Translated Rocky books to Spanish *
- Demos/outreach
 - Department of Defense Conference *
 - First FLL North Denver tournament *
- FRC Parts donation to teams in Colorado
 - Divided and created 2 rookie donation boxes from donated parts to other FRC teams in Colorado. *
 - Donated to 20 FRC teams in total for 2022 season *
- Recruitment
 - Students from events, demos, and our mentored FLL and FTC teams view our shop and work with team members to find their interest in different sub-teams. We created a Shop tour video to allow students to virtually share the experience and connect with us to join the team. – 54% new students for the 2022 season *
- Donations
 - \$3,200 to 5006 team after their work space got destroyed after a tornado

Past 3 years

- Tartan Leadership initiative (Training and Readiness: Teach, Appoint, iNteract)
 - A document holding our 3 internal models
 - Teach Model - it contains each of the skills sub teams learn and are responsible for
 - Appoint Model- Our leadership positions and responsibility's each of them have. 67% of our leadership roles are held by underclassmen
 - iNteract- Our outreach methods for each of our communities and how we maintain that connection
- Rocky Story books - Made read along and posted to YouTube and made available on Amazon for free
 - Hand out to kids at tournaments
- Kilts
 - Created virtual science experiments on YouTube *
 - Created 120 kits and donated 23 kits to schools, 10 to after school programs, and 50 kits to orphanages
- FIRST Support
 - FLL challenge – apart of 25 events, Ran - East metro; Liberty; North Denver

*All events are within the past 3 years, with items designated with a * are within the last 12 months or otherwise noted.*



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- FLL explore – 4 events
- Webinars – reaching 35 teams on Colorado Discord
 - Upside-down electronics board
 - Jevious/Computer Vision
 - Adobe Premier Pro
- Halloween – Robot Disguise days
 - Dressed up robots (Dragons, snakes, ghosts) and made a COVID safe candy dispenser
 - Brought our dragon, ghost and snake to the Windsor Community Center
- Sporan Safety Program – reaching 320 teams at 9 events
 - Through color codes students use the colored electoral tape to quickly identify safety materials needed to run the machine
 - Training program: mentors or experienced students work on one with learners until they are passed to use the machines on their own (Annual)
 - Safety kits are handed out to teams at tournament. (Annual) That include: ear plugs, Emergen-C, Band-Aid, and a small pamphlet about safety (annual)

International outreach

- 10 KILTS (consisting of 5 different experiments each) and laptops donated to an orphanage in India. On-site demonstrations of some experiments were done to engage students.
- 5 KILTS to a school in Lima, Peru. Providing them with a science curriculum to teach students of different ages.

Internship Program - Cycle of success (annual program)

- Cycle of success is an initiative that allows current students who have developed skills that would partner with on-going projects the opportunity to work.
 - Students connect with sponsors who provide internships. Students' professional work experience where they apply the skills they learned on The Highlanders in real-world experiences. These internships fund the futures of Highlanders.
- Partnership with Neaera Consulting, one of our main sponsors, we are able to work with new technologies like connected and automated vehicles, large cloud storage like AWS/Azure and work directly with industry
- We have had 12% student participate in the internship program, 11% alumni and 5% have become full time with Neaera in the past 9 years.
- With this program we have had over \$75,000 donated back to the team (in the past 3 years), 8% students have financially covered college, and have worked on over 8 professional industry projects.
- Interns have worked with companies like USDOT, CDOT, WYDOT, Lockheed Martin, Woodward Governor in the past 10 years.

Teams efforts to recruit students (annual):

- Apolopalooza Event reaching approximately 3000 people
- Word of mouth – 44%
- Feeder from mentored FLLC and FTC programs – 11%
- On-site and virtual tours of our shop - 5%
- From our efforts in recruiting, we have successfully recruited over 90 students in our 10-year history.

Our commitment to STEM education within the team, FIRST programs and community (full history of team)

- Robot Disguise Day (2016-2020)
- Shepardson STEM family night (2015-2021)
- NASA Spaceflight Explorers Week (2014-2016)
- Geek Week (2014-2016)
- Carbon Fiber Demo Days (2016)
- Cycle of Support – Donation to team 4944 to help fund trip to Worlds (2015)

Achievement of FIRST and how we create and maintain relationships (since 2013)

- Stared 14 FLL teams, mentored 21 FLL teams
- Mentor 3 FTC, assisted 11 FTC teams
- Assisted 53 FRC teams
- Mentored and started 10 FLLE teams
- FIRST leadership positions (i.e. Colorado Regional Judge Advisor)

Team History - On-going year-round efforts (past 10 years)

- Defense and manufacturing conference (2022)
- Energy Day (2018 - 2022)
- McKinney Backpack program (2014)
- Northern Colorado Maker Faire (2017)
- HP Haunted House (2016-2017)
- 4th of July Parade (2014-2015)
- Toys for Tots (2015-2017)
- Barends & Noble Book demo (2016-2018)
- CNC Training Classes (2015-2022)
- Boy Scout Adventure Days (2017)
- Liberty Eagle Games Demos (2018)
- Lunch Ambassadors (2014-2020)
- Activity Books/ Coloring books/Adventure packs (2015-2022)
- One Hour of Code (2014-2019)
- Boys and Girls clubs, run FLL teams (2015-2019) and demo days
- FLL Summer Camps (2014-2016), Waterbotics Summer Camp (2015)