



The Highlanders Chairman's Essay

We are team 4499, The Highlanders: a unique model born from 11 kilt-donned engineers, future professionals, STEM ambassadors and young leaders. Our ideas are persistent, our passions are incomparable and our dedication is exceptional. The Highlander's journey is best told through five movements: our mission, our partnerships, our community, our triumphs and our future. We may be small, but we are mighty!

Our Mission

Every model begins with a purpose; ours comes from our mission: to provide youth the opportunity to explore science, technology, engineering, and mathematics—through hands-on experience and support in STEM. To accomplish our mission, we created a 501(c)3 non-profit company, Neaera Robotics. What began as a FIRST incubator in Northern Colorado expanded to fund 10 FIRST teams across the Front Range in the past 8 years. Neaera Robotics brings today's opportunities to tomorrow's engineers.

This year, we created the TARTAN leadership initiative (Training And Readiness: Teach, Appoint, iNteract), a document that details our internal models of team leadership, skill development, and community engagement. Team sustainability relies on institutional memory, TARTAN grooms team members into lifelong mentors and FIRST Ambassadors that remain involved in the FIRST community.

Many of our students lack access to hands-on programs in our schools. 4499 integrates academic knowledge with real world skill development. Each of our student's skillsets range from running manual mills to CAD, JIRA and other industry standard tools. Our mentors encourage us to expand on our own interests, supporting endeavors to make parts out of carbon fiber or build a CNC router.

We are more than a family; we are dedicated engineers. Our community-based team meets year-round with students from 6 different schools, 3 cities and a 45% minority population; but we all share the same passion: leaving a world-wide impact and learning technical skills. Now into our 8th FRC season, we maintain ties with our alumni, inspiring them to volunteer with FIRST across several states after graduation. Parents of alumni are drawn to FIRST as well, volunteering in roles ranging from FLL Judge Advisor to FTC Regional Head Referee. This year, our team coach served as the FLL Regional Head Referee.

Our Community

From mentoring 10 FLL Jr. teams in an after-school program to running a STEM camp in India, 4499 volunteers with unique and diverse communities across the world. We spread the word of FIRST through innovative methods.

In order to reach younger audiences, 4499 wrote four children's books to share the FIRST Core Values. With our *Rocky the Robot* series, we share these values with children through entertaining adventure stories. We hand our copies of our books at events we attend and publish them online. Our students translated our third book into Spanish, as we work with title one schools. Our alumni illustrate our books, making them a creative outlet for team bonding.

In 2016, 4499 put together a spider robot made of spray-painted pool noodles and duct tape on Halloween. Since then, 4499 has made a scarlet dragon with pneumatically-powered wings, head-bobbing snake and LED-lighten ghost. What started as passing out candy to neighborhood kids lead to demoing at HP's haunted house event and our local community center. Our other forms of outreach include Fourth of July parades, summer camps, FIRST Events and Maker Fairs.

Our long running contribution to the FIRST community is the Liberty FLL Qualifier. Since our rookie year, we provide student referees, MCs, scorekeepers and judges. Our parents work the concessions stand and our alumni return to volunteer at this event. 4499 assists events in need of volunteers. We provided Judges, scorekeepers, and a head referee to the Weld County FLL Qualifier in 2018. This year, the Boulder qualifier and State Championships longtime MC was unavailable. 4499 filled the role and volunteered in other positions. 4499 also volunteered at the Northern Colorado FLL Jr. and Kendrick Lakes FLL Jr. Expos.

4499 assists teams across the state and internationally in various capacities. We build friendships with local FRC teams (159,4388) and FTC teams (15403,5899); hosting open practices during spring break, inviting them to our shop when their school is closed, and sharing our knowledge. We also assist far away FIRST teams by reviewing business plans(8250), assisting with bumper construction(1339), machining parts(1410), transporting pits(4550), discussing team structure(4418) and providing meals.

During this year's build season, an FTC team from over 90 miles away came to Fort Collins to compete. We invited them over for dinner after their competition and gave them a tour of our shop before the long drive home.

Tournaments often find teams in tight spots. 4499 passes out rookie survival kits, loan out tools, and assist with supplies. We believe that cooperitition builds a positive atmosphere that incubates cross-team partnerships and new learning opportunities.

Our Partnerships

We believe FIRST is the doorway to a greater community—the professional industry.

Our partnership with one of our main sponsors, Neaera Consulting, radiates synergy. Over the years, several team members have interned and continue to intern in software development, taking their FIRST knowledge to the real world. They work on USDOT Connected Vehicle Pilot projects and complex hospital network infrastructure. In the past 8 years, 10 team members have raised over \$150,000 in direct donations to our 501(c)3 non-profit, all from their internships at Neaera Consulting.

Our corporate sponsors invest their time to mentor us. Mentors from Fleetwood and AMD both aid in our learning process, teaching students on machinery and providing feedback on vision code development. We bring our FIRST knowledge into internships and jobs. Our current team members

intern at Lockheed Martin Space, Woodward Governor, Landcraft LLC Survey and Neaera Consulting. Other alumni have worked or currently work with companies such as Tesla, Sierra Nevada, HP, Xilinx and more to pursue professional employment.

Our Triumphs

This leads to the big “why”; anyone can obtain sponsors and resources to play the robot game, but what about those resources makes a difference in our communities? What makes the journey worthwhile?

Our model is about changing the world; leaving a trail of future leaders and FIRST ambassadors to continue volunteering in key roles and mentoring future engineers. A sustainable model means maintaining a successful team in spite of adversity and retaining FIRST alumni in the FIRST community.

Over our time as a team, we face challenges that test these notions, and emerge stronger.

In our 2018 season, The Highlanders competed with 6 team members, the smallest in our team’s history. We were unsure if we could build a robot in 6 weeks, let alone support FIRST programs and our community. We embarked on an amazing journey that tried our commitment, leadership and dedication. We expanded our skillsets, building more than a robot—we learned leadership, mentorship and technical skills that changed our lives forever. We learned what it meant to be small, and how to persevere, and have fun! We learned that we had a family, of not just parents, but mentors and alumni that showed us that anything is possible!

The results were greater than we could imagine.

Our success was a combination of commitment, dedication, hard work and inspiration to not just build a robot but create a bond of friendship, partnership and a forever family.

We took this passion into our 2019 season, where we continued to make a difference. 4499 assisted 15 FIRST events last year alone. Through our outsized impact model, team members positively affect our local and far-reaching community in big ways.

Our newfound inspiration lead to the creation of KILTS (Kits that Inspire Leadership and Teamwork in STEM), a series of collaborative science experiments with a curriculum grounded in the FIRST core values. We took these to an Indian orphanage of two hundred children. We designed the kits so that they could be reused by several groups of students and tailored various activities to different age groups.

As we go into 2020, 4499 continues to leverage their skills in big ways. Current students presented a robot design, programming and ambassador program at the FLL kickoff event. Another student serves as the FLL Regional Judge Advisor. We continue to support FIRST through shared leadership, safety programs, international outreach, and our continued community involvement. Our model empowers the small to be mighty.

Our Future

FIRST facilitated many internships opportunities, networking and real-world skill development for 4499. Our gratitude drives us to immerse youth in this community.

4499 teamed up with Jefferson County working with principals and school board members to host the North Denver FLL qualifier. 4499 planned and mobilized this event, with a student Tournament Director. 4499 has run this event for two years and found a calling to organize more FIRST events in the future. We intend to engage in more FLL tournaments at a higher level, help start new tournaments and continue serving in leadership roles. Continuing our partnership with ColoradoFIRST, the Highlanders inaugurated and ran FLL judge training calls over the past two years.

The Highlanders' journey started with FIRST, but it does not end there. We measure our progress in our members, our community and our stories. Transferring our knowledge has allowed us to grow, creating an incubator for the next generation of future engineers. Over the years, we have grown from local outreach to international. Our students are trailblazers serving in leadership roles that reach youth. The Highlanders change their community through their outsized impact.

After all: we may be small, but we are mighty!