

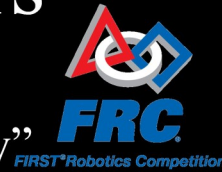


#4499  
www.highlandersfrc.com

# The Highlanders

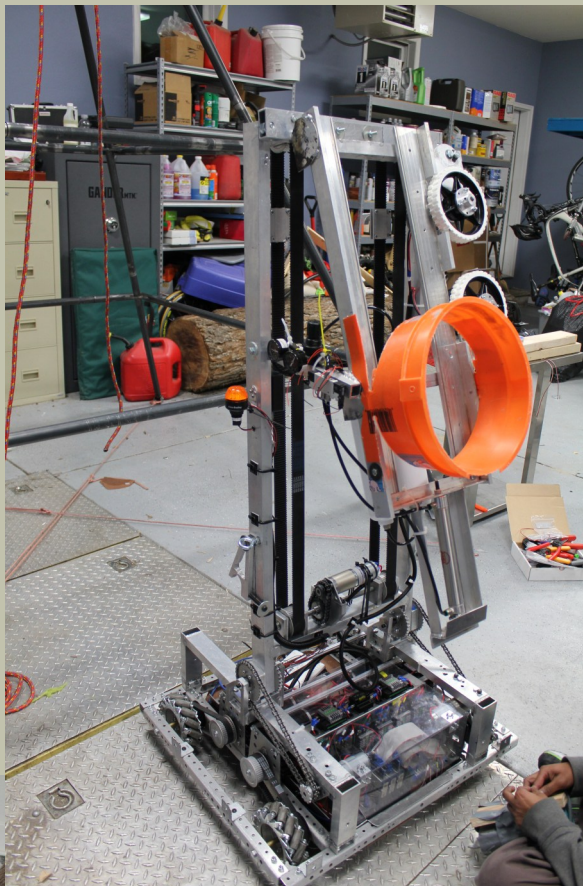
## Robotics Team

"It's not about the game, it's about the journey"



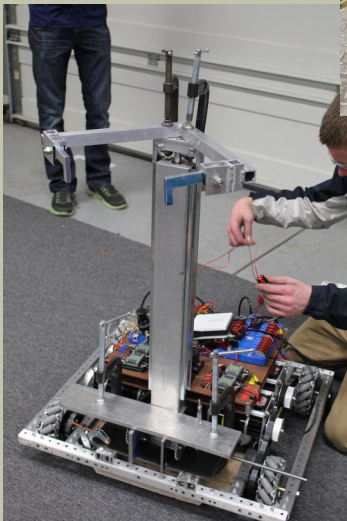
### Our Competition Robot:

"Bag and Tag" day was February 19th. This was the end of our 6-week build season, and at midnight that night we had to bag up our robot, seal it with a numbered zip tie, and not touch it again until our first tournament. We'll get a chance to update it at each of our tournaments, making improvements to it in both programming and physical capabilities—but we're limited to bringing in 30 lbs. of



Who are we?

The Highlanders FRC Team 4499 consists of a group of 19 students in 4 schools in Fort Collins, CO. We are a part of FIRST, an organization working to promote STEM education through co-opertition—a combination of cooperation and competition — in robotics challenges. From August to December we learned all we could about machining, CADing and programming robots, plus wrote a business plan, applied for grants and presented to local businesses and organizations. Since January 5th we've been working frantically on our competition robot, designing and building it



### Two Competing Designs

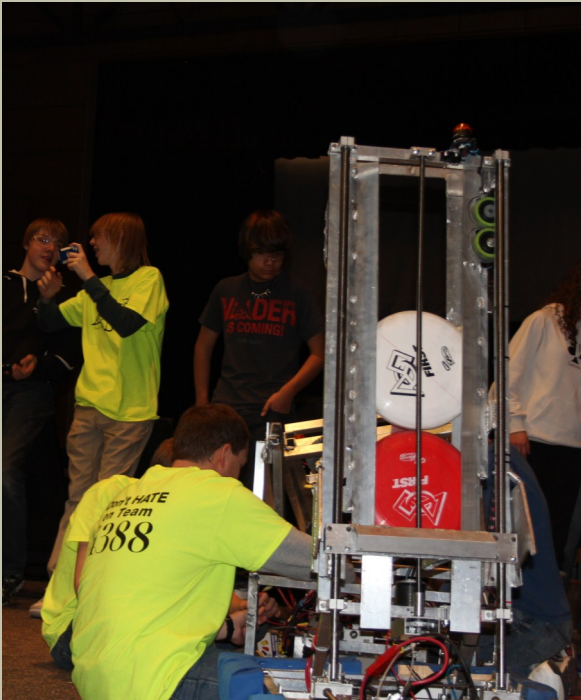
For most of the month, we focused on climbing the pyramid, and pursued two different methods of doing that—one would climb the corner (left) and the other would climb the side (right). We went ahead with building both in order to determine which would be best. It was a good thing, too, because the design we thought the least likely to work (the side climber)





## EXHIBITION

We put together an exhibition with Fossil Ridge High School's team on February 9th. Each team showed off their two robots— our corner and side climbers, and their climber and shooter robots. It was a great chance for each team to see what the other was doing, share problems and ideas, and just connect over the whole experience. We had lots of family and friends show up to see us, as well as two sponsors.

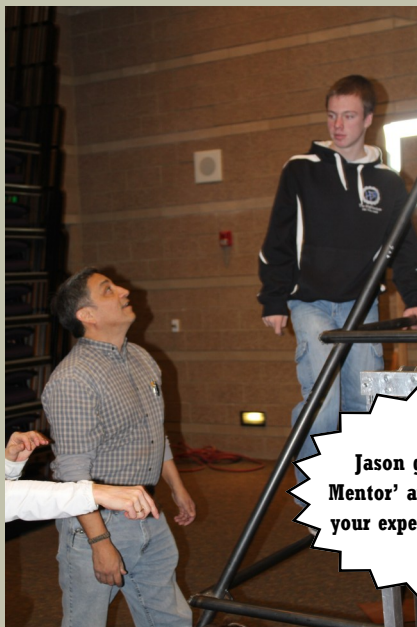


Fossil Ridge High School, team 4388, had a couple of great robots to show us.

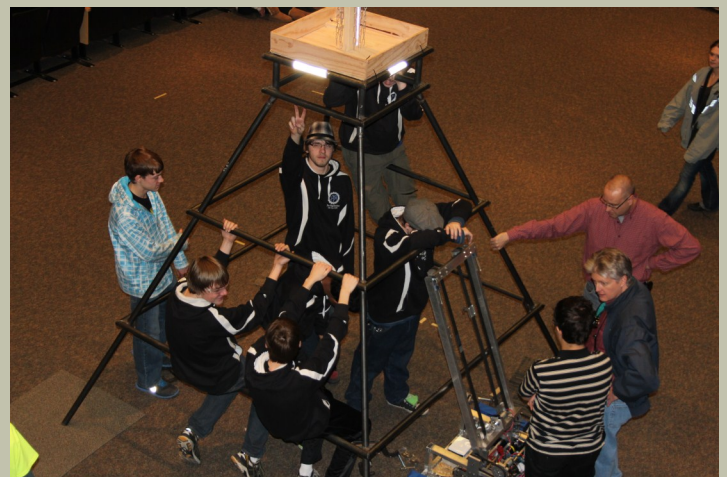


At this point, our side climber was really a side hanger, making it off of the floor, but not onto the first bar. We got the idea for how to attach onto the bottom bar from Fossil's robot!

We got some experience in troubleshooting and repair work on location... and some time to 'hang' out!



Jason gets the 'Amazing Mentor' award! Thanks for all your expertise—and Supplies!

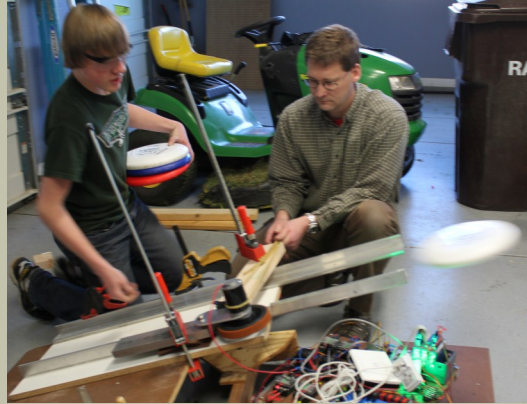




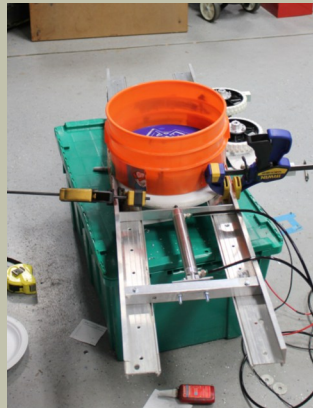
Our last 3 weeks of build season were spent building, testing, and re-building. We worked on the two different climbers up until 10 days before bag-n-tag, when we decided to focus on just the side climber. At that point, most of us continued to work on climbing, while a small group started looking at the possibility of throwing discs—an idea we hadn't pursued before, because we were focused on climbing. But now, with only one climber to work on, we had some spare brainpower.



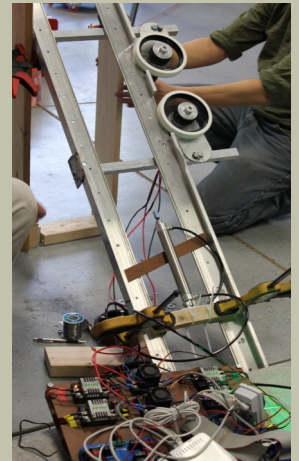
Our first prototype (above) was very rough, but it proved very gratifying—we had Frisbees flying across the room with barely any delay.



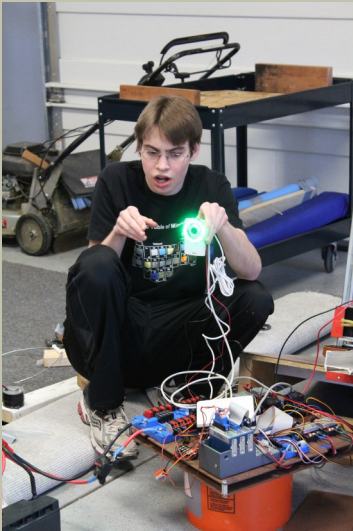
Version 2, left, was straight rather than a semi-circle; we needed to fit onto the side climber bot, and the geometry worked better this way.



Version 4 (left) added a hopper (yes, that is the top of a 5-gallon bucket) to hold up to 4 discs.



Version 3 (right) added a second driver wheel and a pneumatic arm to push the discs up to the wheels.

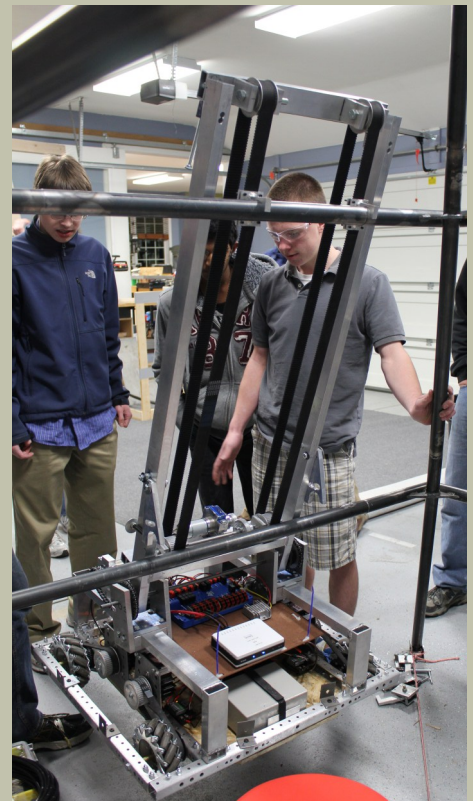


Meanwhile, we were experimenting with a camera and light ring, working to be able to target the disc goals by the retro-reflective tape they have around them.

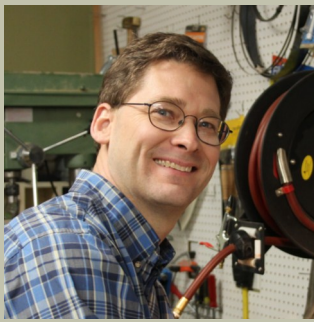
Here, you can see our climbing mechanism—the hooks (on the upper bar) lift the robot via the long belts. If you look closely you can see the triangle hooks just above the lower bar. These support the robot on one bar as the belt hooks go for the next. This picture shows a 10-point hang. Getting above that lowest bar gets us 20 points.



And those programmers were working hard the whole time!



## Highlanders FRC Team Coaches



**TONY**

Tony is a mechanical engineer who has generously offered the use of his shop for all of the parts fabrication. He has the ability to guide the team in idea generation, parts fabrication, problem solving and the test/



**DEAN**

bot.

Dean is an electrical engineer, who is also very skilled mechanically. He has been instrumental in guiding all the electrical and control work that goes into building a robot.



**DEBBIE**

Debbie is a computer programmer, and has worked hard to get the website where it is. She is also the driving force behind the team's organization, and keeps us all moving

in the same direction.

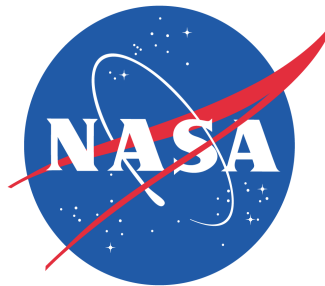


**SONDRA**

al is in good shape.

Sondra is also a computer programmer, and has worked with the programming team to get us going. She is a genius editor, and makes sure all of our written material is in good shape.

## A Very Big 'Thank You' to our Sponsors!



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## Our Robot, Bagged & Tagged



Ready for our tournament in Lubbock, Texas

February 28-March 2, 2013

Keep an eye on our website for updates!