



Google

Girl⚡Powered

VRC Girl Powered Online Challenge  
Sponsored by Google

2323 B Automation Nation

Naomi Elmer, Hope Elmer, and Megan Henstra.

# Meet Our Team

## 2323B Automation Nation

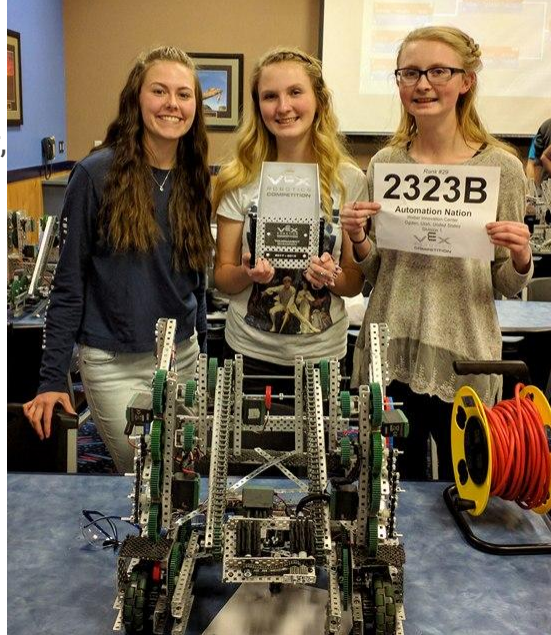
Naomi Elmer

Team Captain, Programmer, Notebook Designer.

Megan Henstra

Digital Designer, Co-programmer,  
Backup driver.

**AUTOMATION  
NATION**



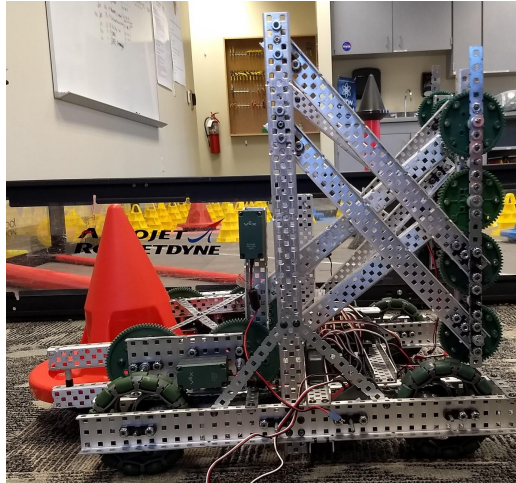
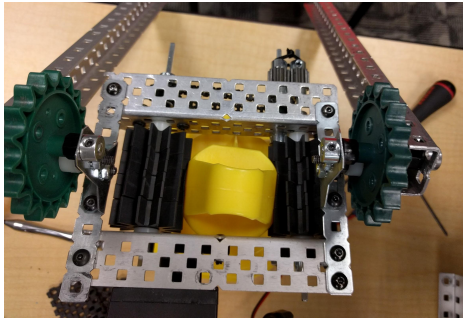
Hope Elmer

Team Driver

Weber  
Innovations  
High School.  
Ogden, Utah

# Girl Powered Means...

Girls and boys have different points of view and different insight to contribute. Girl Powered means powered by girls creativity and ideas. When we hear Girl Powered, we think of a small handful of amazing girls. There are so many boys out there, they might be the rare, but that just makes them even better. You can see we are Girl Powered just by looking at our team, of all girls!



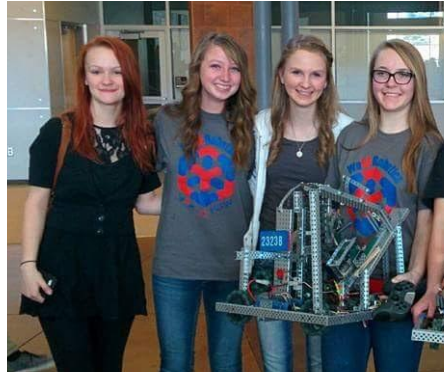
There are some noticeable differences between our robot at competitions. Within our robot you can see our different but creative takes, we have a different mobile goal carrier that is modeled after train wheels. And we have a reverse four bar that has an arm flipping from the front of the robot to the back to the mobile goal carrier. We have had different ideas than most teams, but it makes us stand out more.

# Demonstrating Girl Powered

Our school had its first all girls team for the 2014-15 season. Since then there has been an all girls team every year. Last year Megan joined an all boys team later into the year, after talking we got her to join us this year. Through the PLTW program there is a lot of advertisements and endorsements towards the robotics program, here we reached many more. Two other girls saw there was an all girls team, excited to join us next year when they are old enough! There are so many tasks and challenges in robotics, that we welcome all the help we can get.



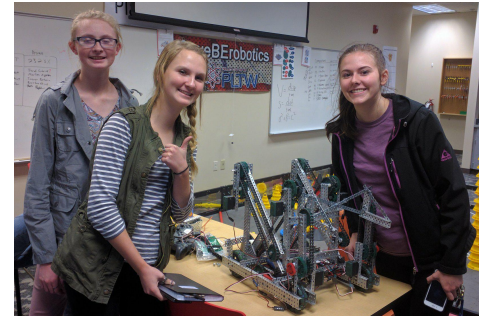
2014 - 2015



2015 - 2016



2016 - 2017



2017 - 2018

# Team Roles



Naomi started out as our team programmer, since she was the only one with previous experience. Recently Megan has been learning, now we have two minds to assisting in programming. Naomi is the main designer of the notebook, which has helped us see our progress. Find crucial information, and even allowed us to be considered for awards at competitions. Hope and Megan were co-drivers when we had 2 remotes. When we changed to only one remote, we had to test and find our official driver. Hope now is our official driver, but it doesn't hurt to have a backup!

On the field during a match, Hope drives while Megan and Naomi do strategy. The two of them will count the points to see what should be a priority. They watch the time to allow Hope to know when to start finishing up a current task and move to our final task of moving remaining mobile goals.

# Specialized Areas

We all build together, and we have parts we specialize in. We have a main design we wanted to implement, done the most research and carried out majority of the building. We each ask for help and work together to help the others idea come to life. Just because we specialize in it doesn't mean we do it all by ourselves. It is still a team effort.

Megan is our claw specialist.

NOVEMBER 13

new claw:  
 - roller allows quicker intake/outtake, requires less motion on remote

today:  
 - took apart mobile goal lift  
 - new claw

↑ add bearing blocks  
 use chain, remove middle gears  
 rotate motor  
 cut rubber  
 M. Hester  
 M. Hester

11/13/17  
 11/13/17

Hope is the lift specialist.

NOVEMBER 21<sup>st</sup>

- let the arm bars replaced with the same size as the lift bars because it needs the same length arms to stay in a straight line.  
 - added in the correct spacing for the second bar on the lift gear train, added on the second piece.  
 - finished attaching the bar that goes all the way across.  
 - put the arm post on the lift arms 22 holes with 16 gears.  
 - updated the arm post to a diff gear train. Eventually we will change the size from 27 holes to 22ish holes if we had a gear train of 16 gears.  
 - we went shorter for stability, and it doesn't make much of a difference in height to be a disadvantage.  
 - let's filed down the claw on as small as it can be. Right

2 diff gear ratios that have coded with the right option.

up/down motor  
 M. Hester  
 M. Hester

11-21-17  
 11-21-17

Naomi specialized in the Mobile Goal Carrier.

NOVEMBER 19

- Mobile goal carrier:  
 - started prototyping testing different ways to make it go up and back while in the disc constraints.  
 - stealing our idea after a train wheel system.  
 - put a bar across connected in each gear. then it will grip and down with cover gear and stay the same distance apart.

next time:  
 - Remove chain and sprockets (useless)  
 - move drive outwards to create room for mobile goal carrier  
 - flip bars on lift so it's flat on flat  
 - add bearing blocks wherever there's an axle

Claw:  
 - add bearing blocks  
 - use 2 gears and chain  
 - flip bars outwards  
 - flip motor  
 - cut rubber sprocket

M. Hester  
 M. Hester

11/13/17  
 11/13/17

Through all these task we learned even if you know the most, there are other ideas that are better. Everything is subject to change, but we couldn't do it without each others ideas and skills.

# Different Ideas, Same Goal

**NOVEMBER 29** 119

**PROBLEM:**  
 lift gear train is outside the size limit, and the long bar is going to drop off of the cone in front of the MGL instead of dropping off on top of the MGL.

**POSSIBLE SOLUTIONS/BRAINSTORMING:**

• move the beginning of the R4B to the front of the robot. Same exact thing, just flipped from middle → front.

**PROS:**  
 - shorter arm to pick up + drop on cone  
 - longer arm might be 18"

**CONS:**  
 - harder to get the exact spot for the cone to be pushed up by the claw  
 - more time used by the arm is long

**BEFORE** **AFTER**

• move the begging of R4B to the back wheel. Pick up w/ claw in the front drop off on the MGL.

**PROS:**  
 - less distance from cone to wheel  
 - shorter claw arm

**CONS:**  
 - everything cluttered/ crammed in the back  
 - have to pick up cone at the front close to center.

**AFTER**

• move the ~~beginning~~ all the R4B arms 2 hole shorter.

**PROS:**  
 - less redundancy, keep most of the same parts + pieces  
 - less gears. All within the 18" size limit  
 - more room for less space  
 - less noise/flex in the vertex

**CONS:**  
 - lose height  
 - when current claw arm lengths, we drop the cone (about 12" above the cone, landing on cone riser).

**AFTER**

**TO DO TOMORROW:**  
 - figure out spacing for the claw arm - too small right now  
 - figure out why the dumb lift is different on each side - LEFT SIDE WRONG

**Naoufelmer** 11-29-2017  
**A. Davis** 11-29-2017

When there is diverse perspectives you can get many different point of views, views that can be looked at and debated to find the best view for our robot. We are so lucky to all get along on our team and be able to trust, this allows us to decide which is best without hurting each other. We have the main goal of success, and we each know how to take criticism and improve. This allows us to continually come up with new ideas and make new improvements.

**OCTOBER 24** 65

**Stability ideas:**

① **triangular bar w/ pivot points**  
 - extra support post beneath imitating the whole R4B lift, just smaller scale.

② **attach claw here**  
 - piece with edges going perpendicular to bar is too long and space is out too wide.

**How to Attach the claw:**

① **put 2 of these pieces on each edge**

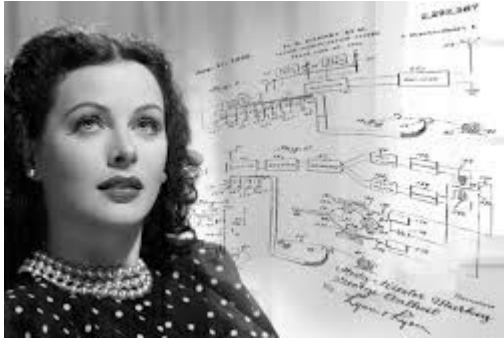
② **attach the edge on the sides of the claw**

③ **one on each arm with the back of the claw attached.**  
 - Attach the claw onto the flat through the middle sides

You can see in our notebook how we have many ideas, show the pro's and con's, and then the team makes a choice based off of the pro's and con's we decided.

# STEM Role Model

## Hedy Lamarr



An actress and inventor. In many films she was considered the “most beautiful woman”. She and her partner George Antheil created a secret communications system. It had changing radio frequencies that blocked out other users. This allowed for the military to communicate without enemies listening in during WWII. She designed this with the idea of stopping Germany and the Nazi’s. Later she was recognized and awarded many new awards. Hedy shows that girls really can do anything. Beauty actress and an inventor in STEM are two different things. But she succeeded in both fields and has become a role model to many.

On our team we support all of us girls in every task we do. In robotics and engineering we work close together, but we each have our own thing we do. Megan is a great singer with a love for choir, Hope and Naomi both are on a lacrosse team. All three of us happen to have a love for government, and are each on a City Council. Through every team or group we are apart of, we support each other because we know strong girls can do anything they try. No matter how different the tasks are, just like Hedy.







We hope to inspire other girls to join in robotics and the STEM field. Our endeavors have been so worth it and we love all the experiences we gain through programs like these!

# Thank You!