



## Team Origin Story

FTC Nova Pyra 25619

- Younger sibling to the FRC 2992 SS Prometheus team
- Inspired by the myth of Prometheus, the titan power of knowledge, innovation, and the spark of creativity
- Nova Pyra = “**New Fire**” (Mix of Greek and Latin Roots)
- Dawn of a new era
- Logo represents the fire of passion surrounded by the wings of a phoenix rising to new heights
- We are more than a team; we are family!



# Meet the Team!

## Build

Frank  
Sam  
Wyatt  
Evee  
Hailey  
Victoria

## CAD

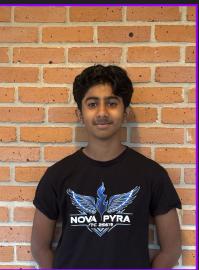
Hailey  
Victoria

## Code

Hailey  
Wyatt  
Victoria

## Outreach/ Media

Julianne  
Evee  
Taylor  
Scarlett  
Viraaj  
Victoria  
Hailey





# COB Strategy and Game Plan



**Nova Pyra 25619**  
FTC 2023 – 2024 COB Strategy Brainstorming Session

**Directions:** Take desired robot tasks as C, O or B.  
C = Critical (robot task is critical to the strategy, MUST be included)  
O = Optional (robot task that is optional, but the overall strategy won't fail without it,  
B = Bypass (robot task that is bypassed in order to accomplish overall strategy)

**Autonomous Period Actions (30 seconds):**  
Tasks:  
 Possible points for Autonomous strategy  
Critical Points: \_\_\_\_\_  
Optional Points: \_\_\_\_\_  
Total Points: \_\_\_\_\_

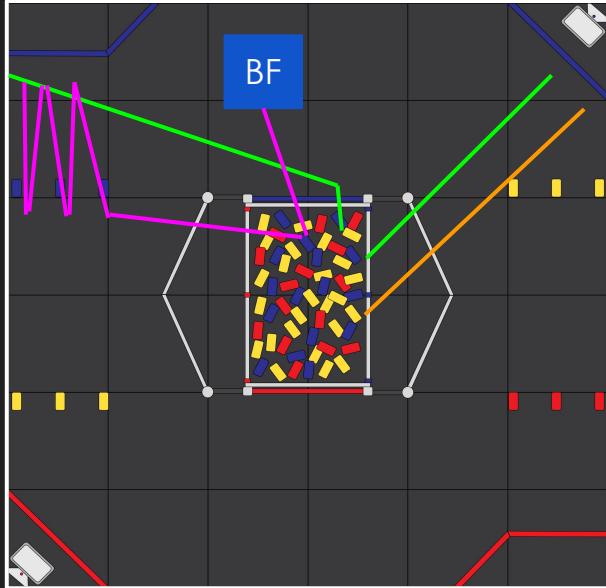
**Driver-Controlled Actions (120 seconds):**  
Tasks:  
 Possible points for Driver strategy  
Critical Points: \_\_\_\_\_  
Optional Points: \_\_\_\_\_  
Total Points: \_\_\_\_\_

**End Game Actions (last 30 seconds of Driver-Controlled Period):**  
Tasks:  
 Possible points for End Game strategy  
Critical Points: \_\_\_\_\_  
Optional Points: \_\_\_\_\_  
Total Points: \_\_\_\_\_

**Contributing Team Members:**  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Overall Game Strategy Total Points**  
Total Critical Points: \_\_\_\_\_  
Total Optional Points: \_\_\_\_\_  
Total Points: \_\_\_\_\_

\*Attach a detailed explanation of your game strategy



**C:** Critical  
**O:** Optional  
**B:** Bypass

- Autonomous** —
- Pre-load: Specimen & score
  - Move specific alliance colored samples into human player area

## TeleOp —

- Start scoring with prepared specimens from auto
- After specimens, Bullfrog runs cycles through yellow samples in high baskets, later turning to blue samples in low basket after filled

## End Game —

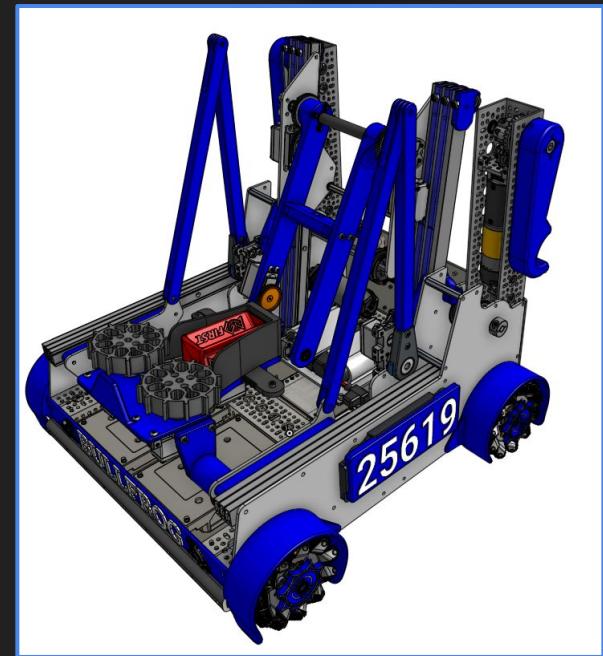
- Climb to level 2 ascent



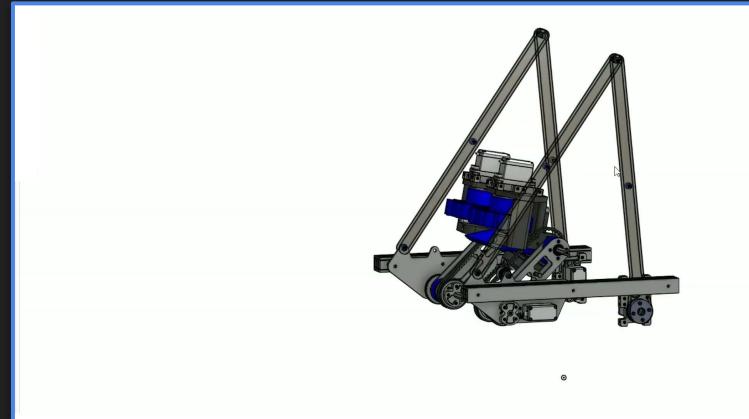
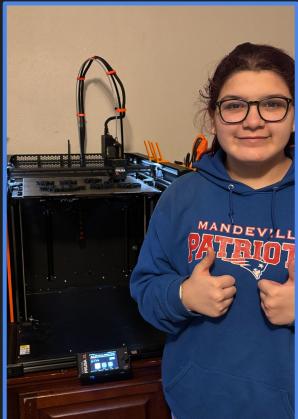
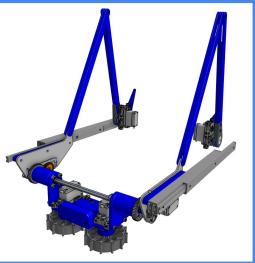
# Our Robot, “BullFrog”

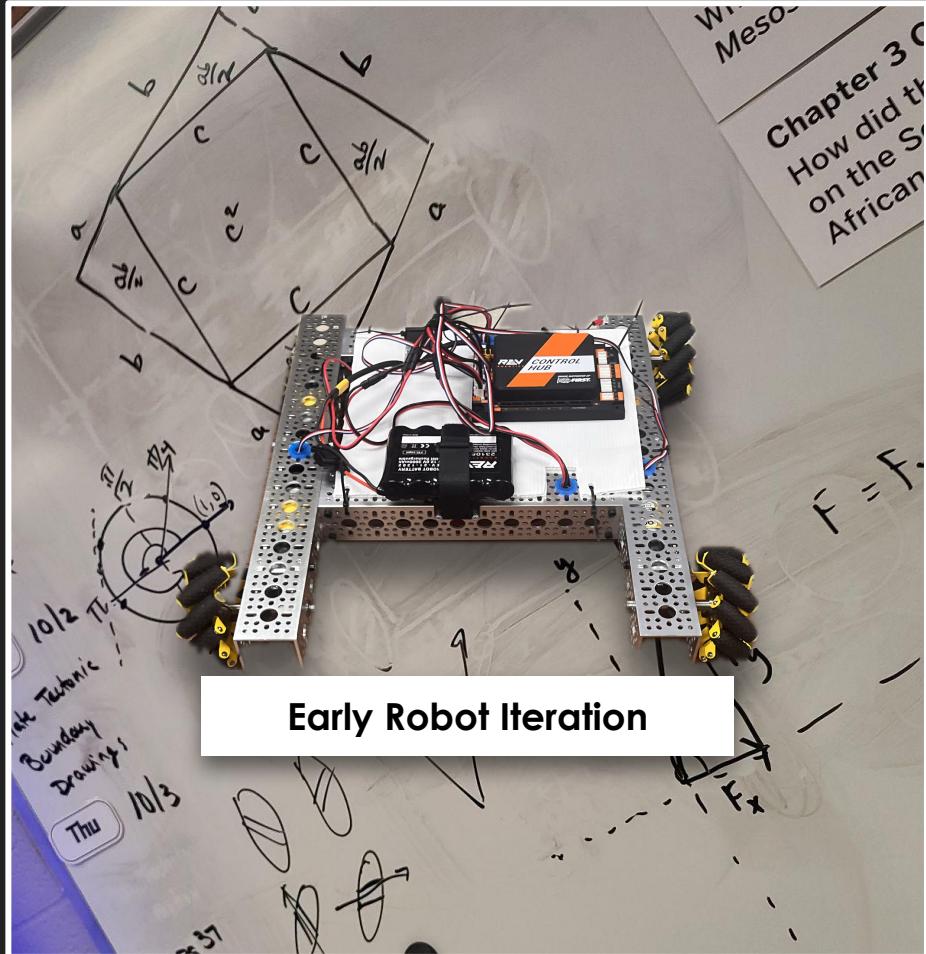
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Inspired by the song,  
“Joy to the World” by  
Three Dog Night,  
our robot, **Bullfrog**,  
is named in honor of our  
teammate,  
Jeremiah Bivins,  
who passed away earlier  
this year.



# CAD & 3D Printing





## Drivetrain

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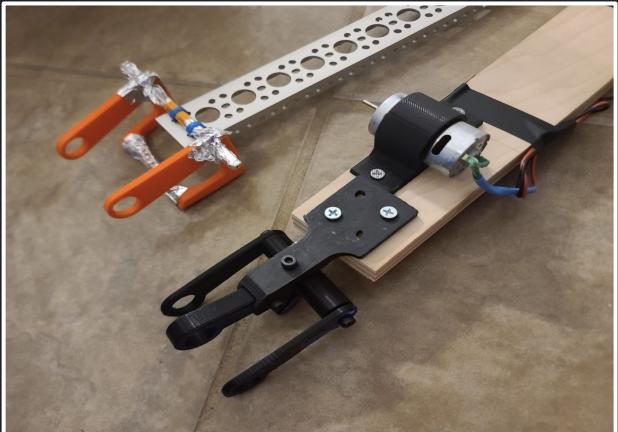
- Holonomic drive and feedback control
- Dead wheel odometry
- Built-in IMU = real time robot pose
- Limelight for computer vision

# Robot Design and Build Process

## Intake Prototyping

### Prototype #1

- Powered by hand drill
- Meant to have rubber disks for servo savers
- Struggled to hold pieces straight or pick up consistently



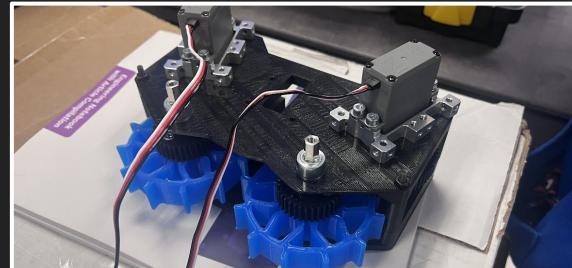
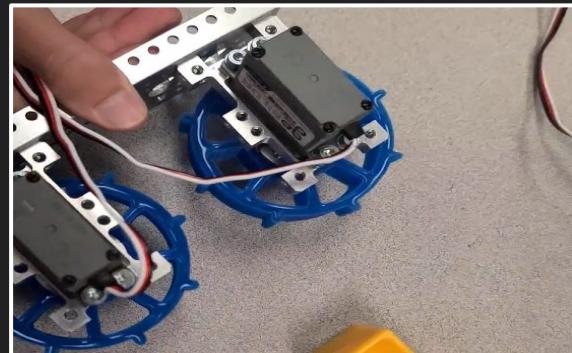
### Prototype #2

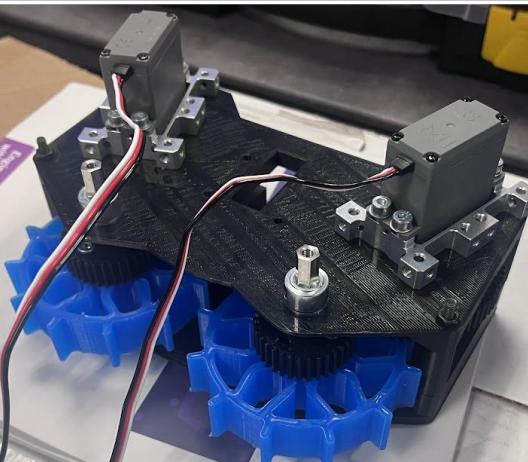
- Powered by a 9v
- On a wooden rod
- Mechanism had one top prong and two bottom prongs



### Prototype #3

- Active intake mechanism
- Self-aligns samples
- Implemented color sensor to identify specimen color
- Open-topped for sample intake



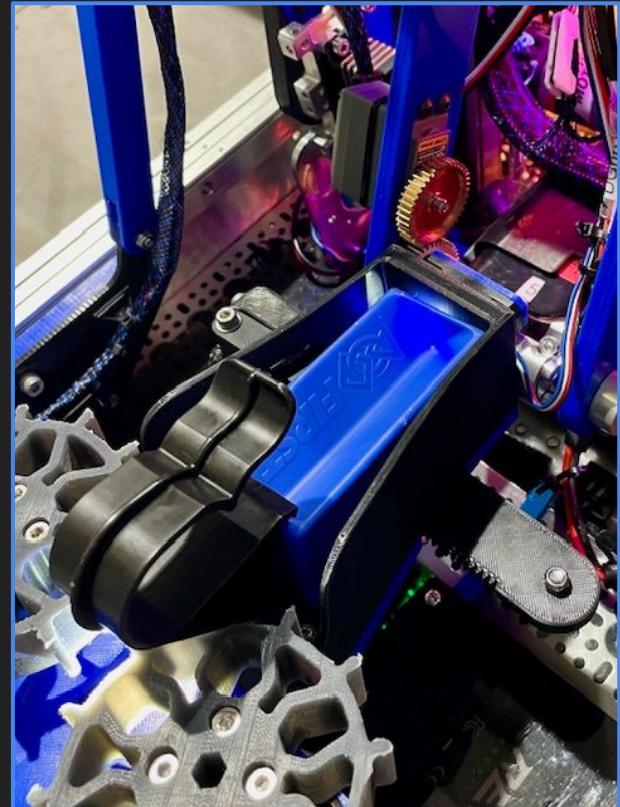
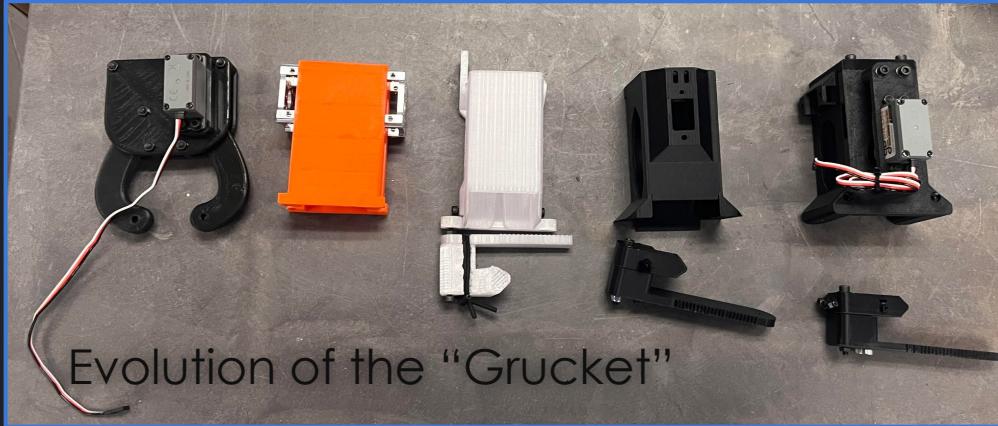


# Intake Wheel Molds and Casts

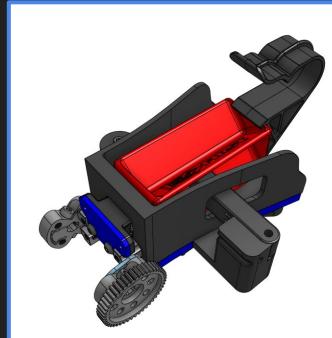
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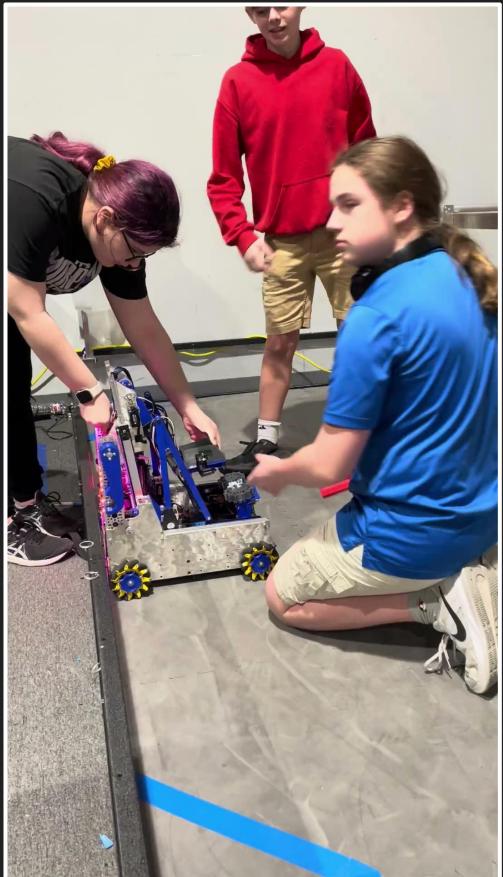
# Prototypes for Bucket a.k.a. The Grucket



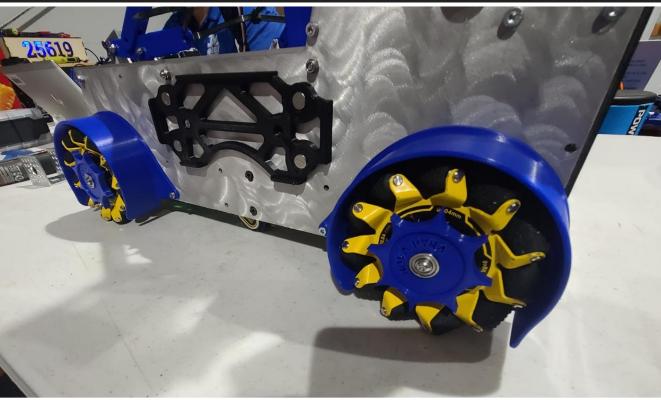
The “Grucket” is a combination between a bucket and a grip in order to score by securing specimens and samples.



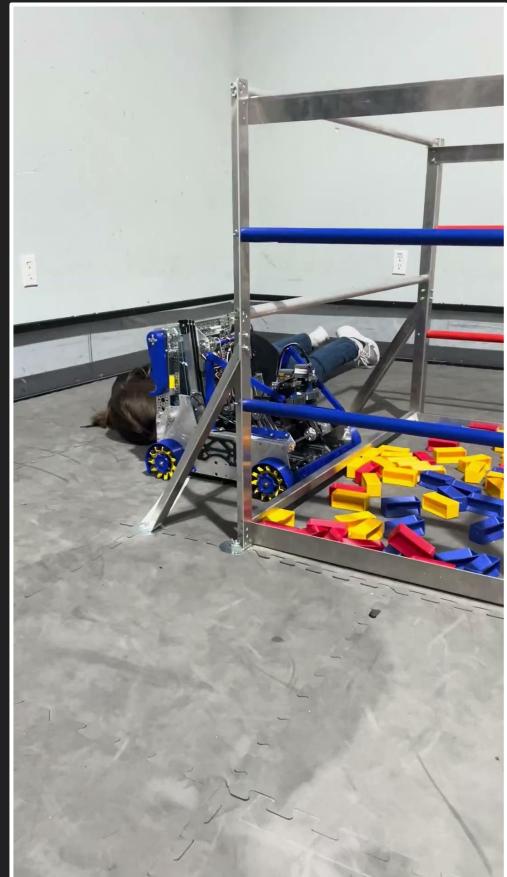
## Grucket Mechanism



## Wheel Covers and Spinners



## Sweeper Mechanism



## Climb Mechanism



## Important Subsystems & Commands

### Lift

- fast movement by using PID

### Climb

- 2 level ascent

### Intake

- automatically pulls through

### Sensors

- Color Intake & Depositor
- PID Control
- Built-In IMU
- Deadwheel Odometry



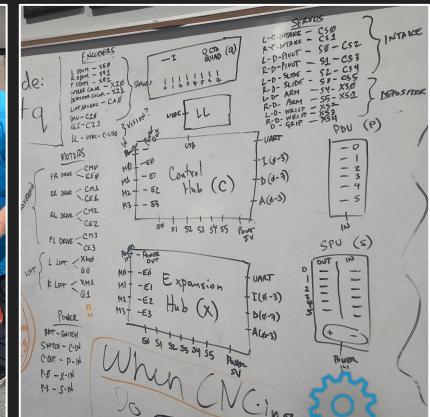
## Programming

### Improvements

First Qualifier: intake & scoring

Second Qualifier: climb

State Championship: autonomous



12/7/24, Hammond Qualifier:

- Won the Innovate Award
- Picked as Alliance #3 in the elimination rounds → Made it to final round against Alliance #1
- Qualified for State!!



Our team went into this qualifier as a rookie team - very green!



1/11/25, Walker Qualifier:

- Won the Innovate Award
- Alliance captain of Alliance #4

Made the playoffs and got to test our lift. Ready to get back to work on improvements for State!

## Team Goals

Our goals as a team are:

- Gain more knowledge about the technological world
- Work together and combine our skills to build the best possible robot
- Share the values of FIRST with our community
- Connect with teams at competitions and events



## Team Improvements

Our team has worked diligently to improve in many ways like:

- PID control on lift / elevator
- Climb Feature
- Smoother Button Action
  - Drivers can now do multiple steps with one button!
- Fixed intake color sensor
- Faster cycles



## Past —

- Recipients of a Deborah Rochelle Foundation Grant
- Summer code & CAD teaching sessions with the highschool team/adult mentors.
- Collaboration in the shop with FRC Team S.S. Prometheus & FTC Team EagleBots
- Sponsorship from local businesses
- “STEAM Night” at PES
- Science Lab mural at MJH



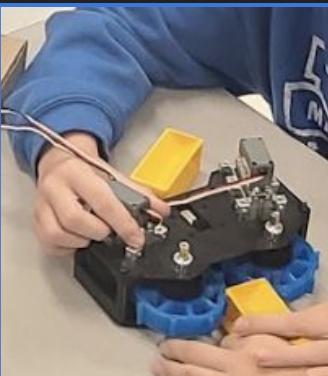
## Outreach/ Community Involvement



## Future —

- Host summer robotics camp
- CAD and cut trinkets to share at qualifying events & competitions
- Book Fair at Barnes & Noble
- Cane’s Family Night

# Core Values and Team Dynamics





**DDG**



Ryan and  
Katherine  
Harvey

## Nova Pyra Sponsors:



 **NETCHEX** SM

**intralox®**



Susie and  
Ed  
Weideman



Ben and  
Vera Vree



**STRUCTION**  
SOLUTIONS

Family  
Vree and  
Van Shank

