

# Sumo Bot Competition

**4:00 P.M. , October 25, 2016 , Dubois Center RM 19**

Team 21

Rene Diyarza - Project Manager

David Feetterer - Budget Liaison

Jose Villegas - Website Developer

Yousef Alghareeb - Client Contact

# Project Description

Four different types of robots must be design for four different types of competition.

Two robots compete in a head-to-head match following the basic system of traditional human sumo matches.

NAU is our primary sponsor financially and managerially

Showcase our skills obtained from the undergraduate program at NAU

NORTHERN  
ARIZONA  
UNIVERSITY®



# Design Considered (Autonomous)

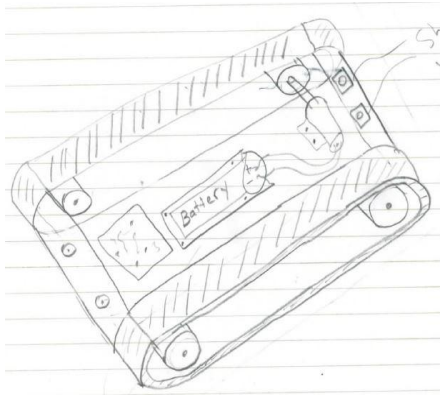


Figure 1: Treads

A: Better weight distribution.  
D: Less traction.

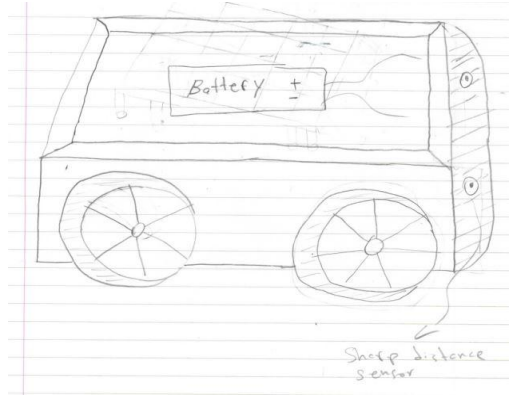


Figure 2: 4 Tires

A: Produce more speed.  
D: Harder to build.

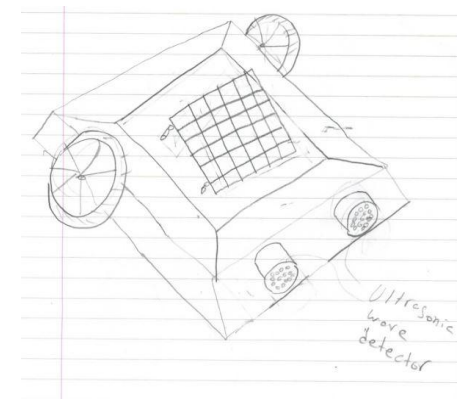


Figure 3: 2 Tires

A: Does not need recharge.  
D: Weight is not distributed evenly.

# Design Selected (Autonomous)

- Tires are more durable, requires less torque, and produce more traction than treads.
- Infrared sensor is cheaper than ultrasonic detectors and more accurate and more accurate.
- Battery is the most reasonable choice for the autonomous robot.

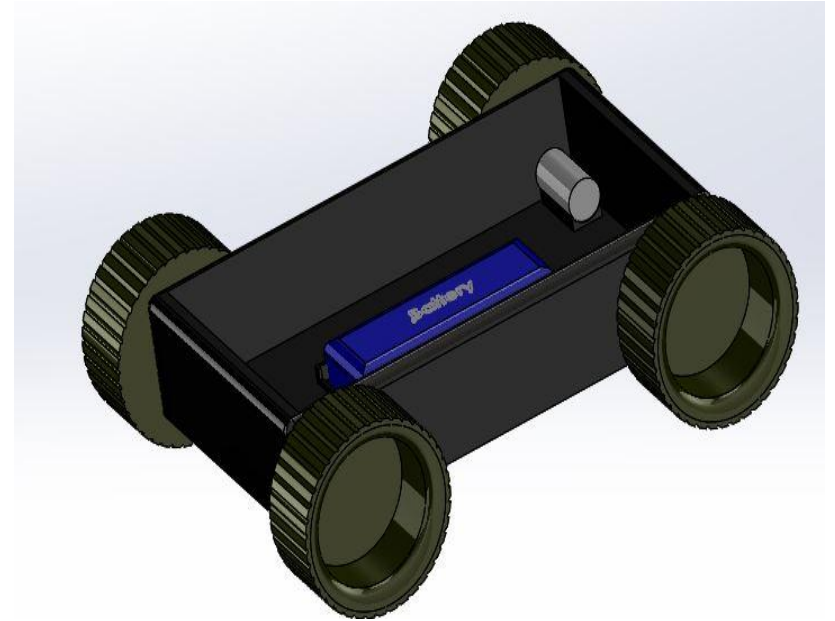


Figure 4: Selected Design

# Design Considered (RC)

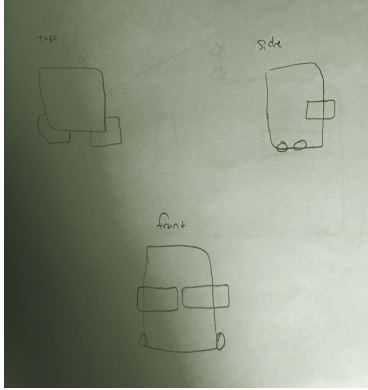


Figure 5: BumperBot

A: Controlled  
impact

D: Bulky

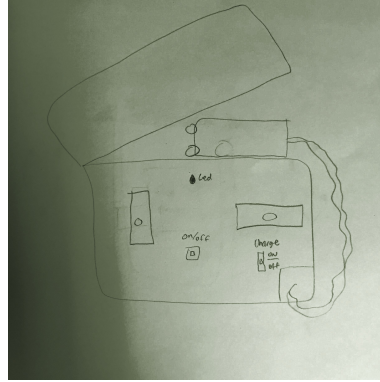


Figure 6: Charging Controller

A: No need for  
outlet

D: Focused more  
on remote than  
robot

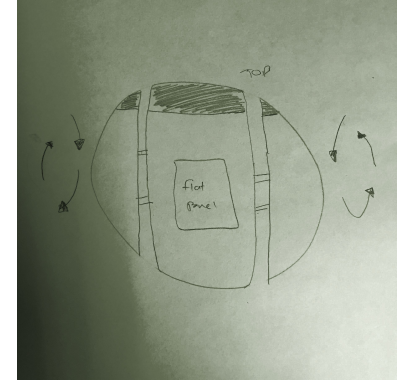


Figure 7: SpinnerBot

A: Spherical

D: Unbalanced

# Design Selected (RC)

- The biodesign showed to succeed over the others
- Bumpers targets impact
- Adjustable bumpers for any competitor
- Smaller front wheels for balance

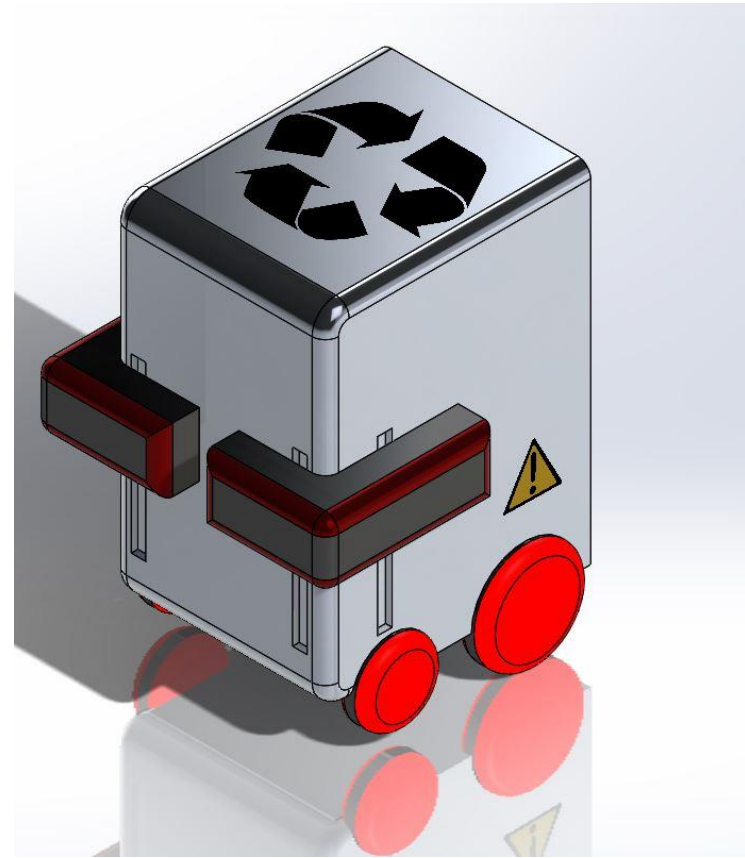


Figure 8: Selected Design

# Design Considered (Nano)

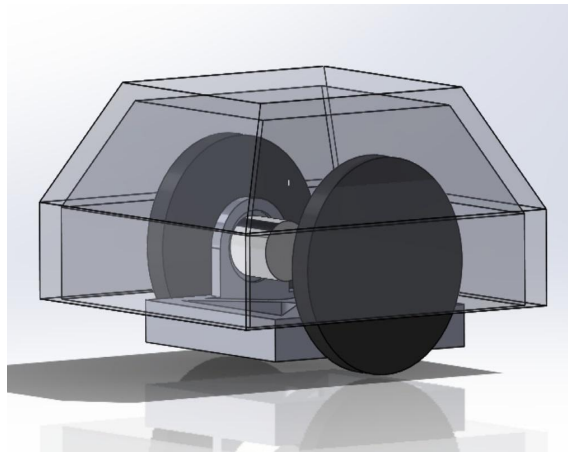


Figure 9, Defensive kicker Preliminary Design

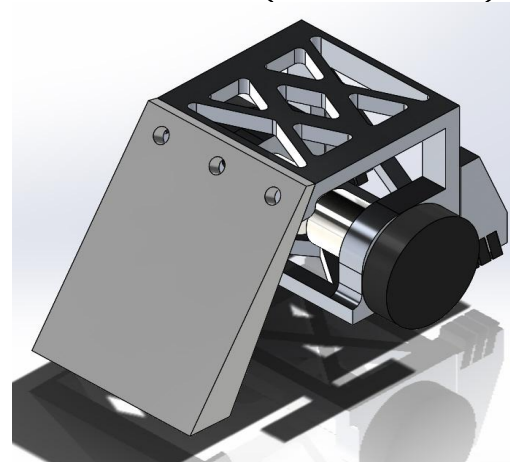


Figure 10, Bio Inspired Preliminary Design

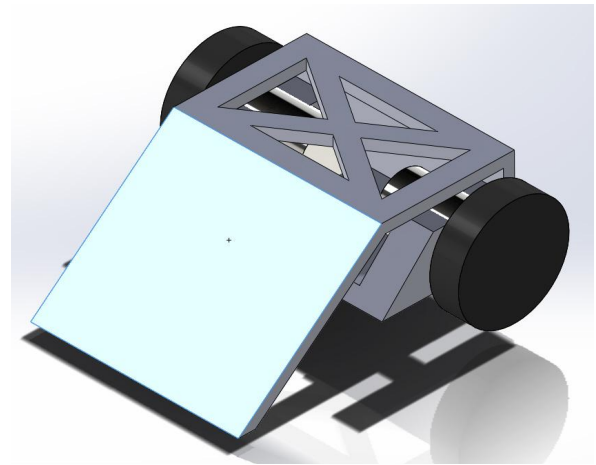


Figure 11, Uni-body SumoBot Preliminary Design

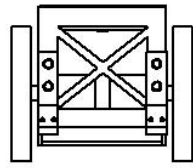
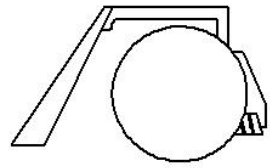
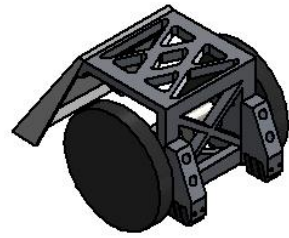
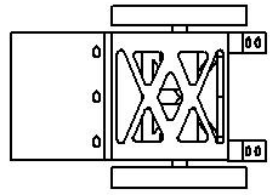
A: Defense  
D: Increased weight, Minimal interior

A: Resist pushing from Opponent  
D: Manufacturability, Increased Weight

A: Simple, High Maneuverability, Various Centroid Location  
D: Low Profile-easy to tip, minimal interior

DF

# Design Selected (Nano)



TITLE: Bio Inspired		
SIZE	DWG. NO.	REV
A	Final	
SCALE: 2:1	WEIGHT:	SHEET 1 OF 1

## Advantages:

Resist Opponent, High Maneuverability, One Structure (i.e. better response to applied forces), Large area to house and protect electronics.

## Disadvantages:

Increased Weight, High Center of Gravity, Large Stress concentrators

6 Figure 12: Preliminary Bio-Inspired Design



# Design Considered (Bartending)

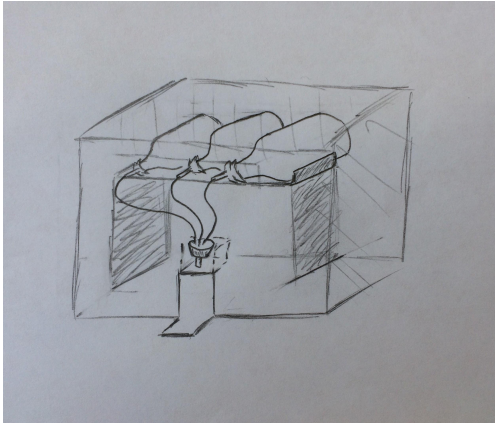


Figure 13: Dispenser

A: No room for error

D: Not appealing

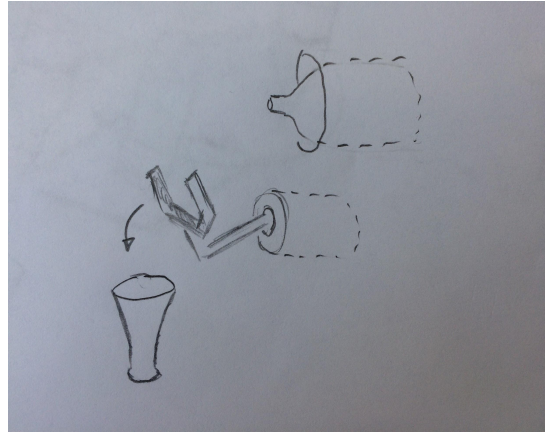


Figure 14: Clamp

A: Movement/Appealing

D: Coding (Precision)

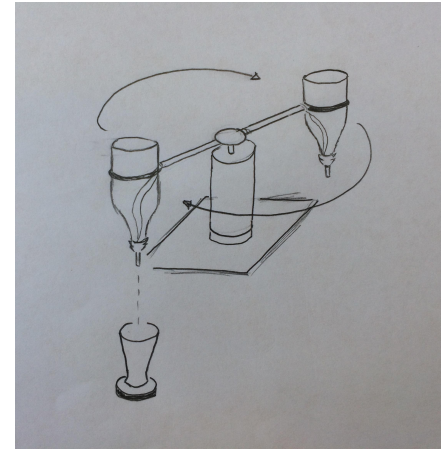


Figure 15: Carousel

A: Variety of drinks

D: More weight

# Design Selected (Bartending)

- Has the capability to firmly grasp the bottle or container
- Multitude of angles
- Can be more precise than other designs (Controlled)
- Catches the attention of the audience

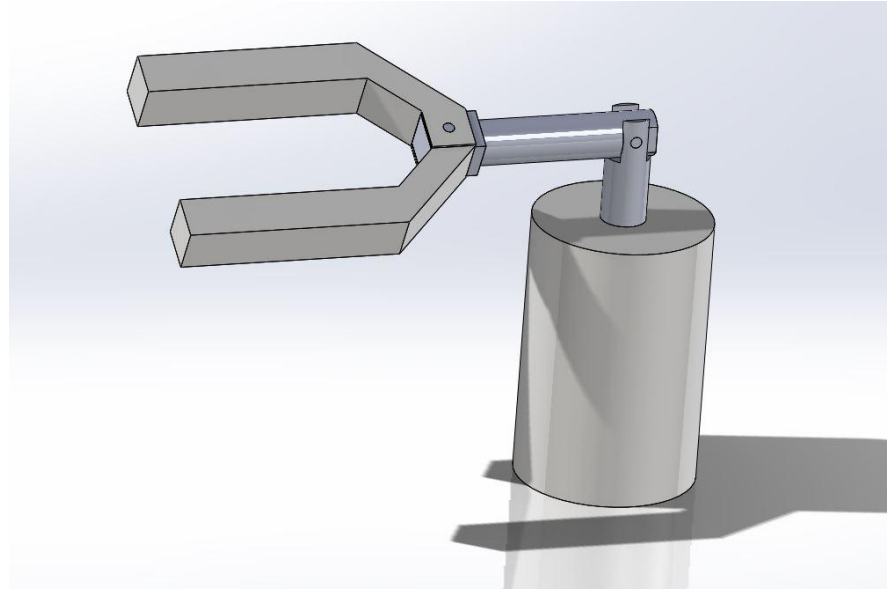


Figure 16: Clamp with Base

# Schedule

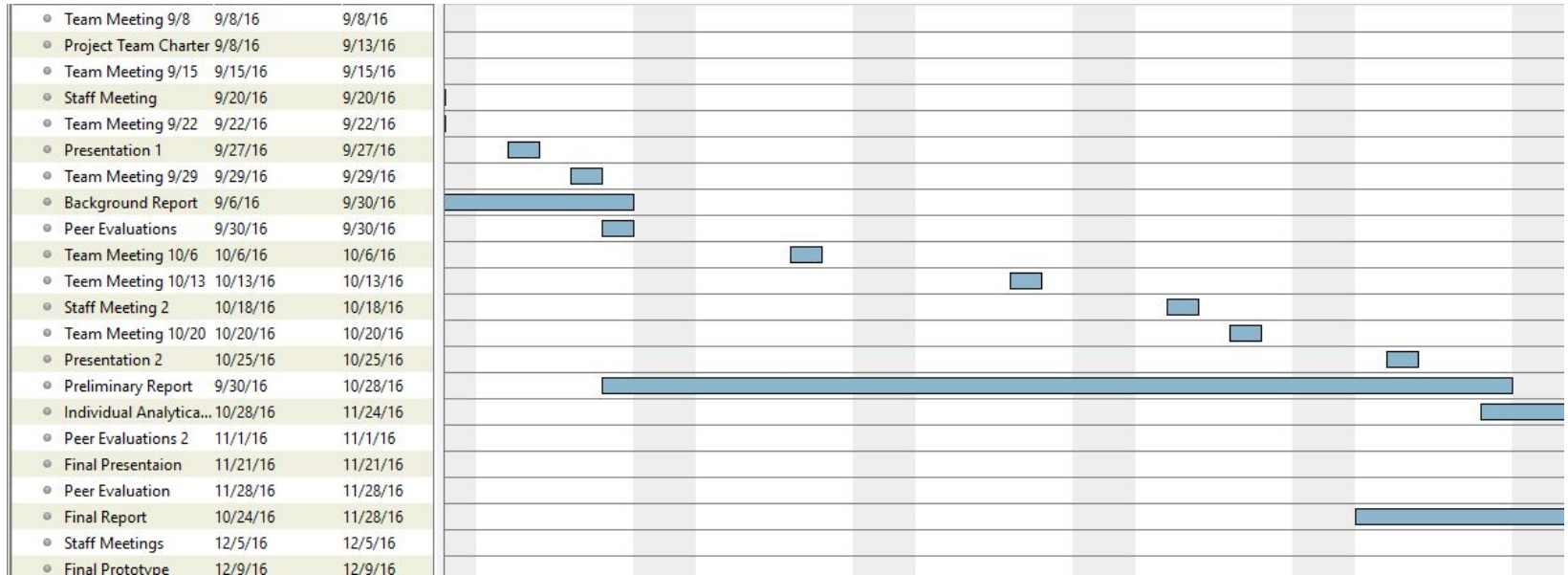


Figure 17: Gantt chart

# Budget

## Project's budget

- Provided: \$ 1000
- Prospective Sponsors: Mother Road, Lumberyard, Hops On Birch, SAE

## Anticipated expenses

- Entry Fees: \$ 190
- Electronics (Microcontrollers, Motors, Sensors, Batteries, ESC, Power Transmission):  
\$ 200/robot
- Building Materials: \$ 80

Remaining Balance: \$1000

# Questions and Answers