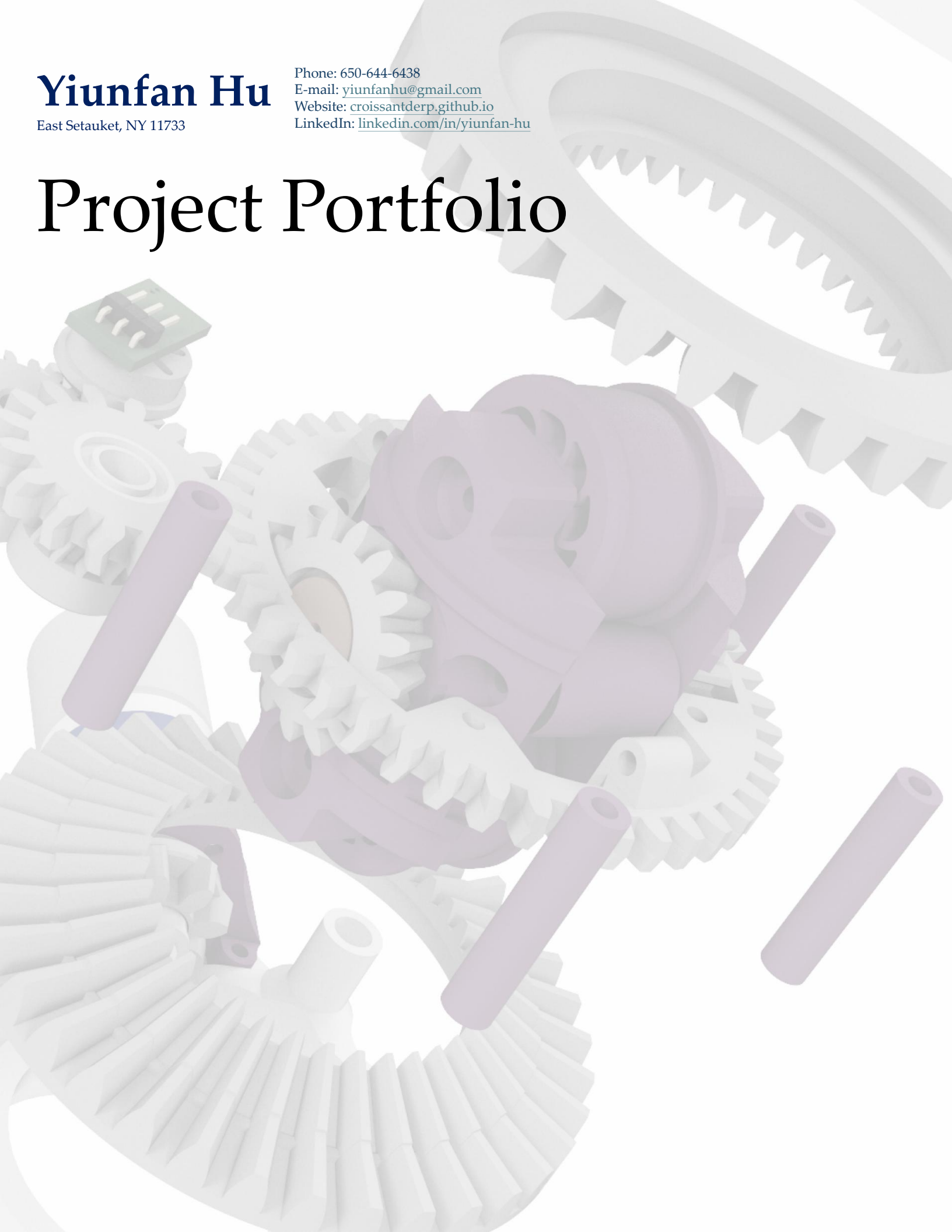
Yiunfan Hu
East Setauket, NY 11733

Phone: 650-644-6438
E-mail: yiunfanhu@gmail.com
Website: croissantderp.github.io
LinkedIn: linkedin.com/in/yiunfan-hu

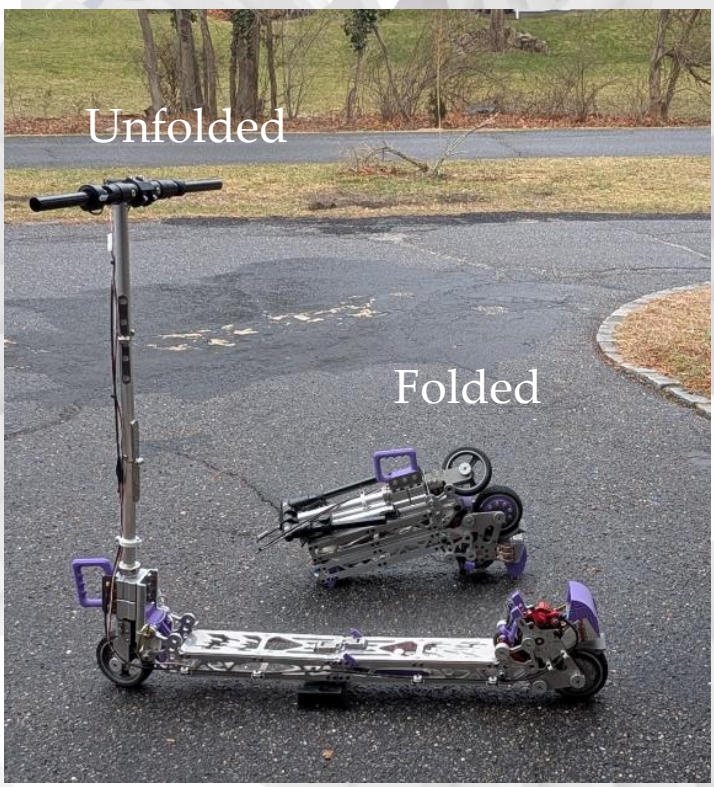
Project Portfolio

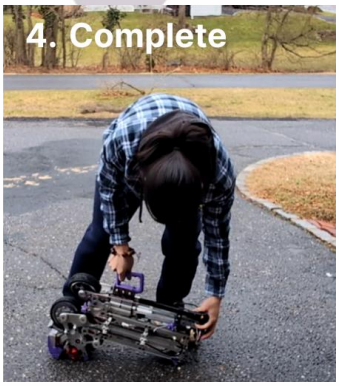


"Javelin" E-Scooter (Link)

A super compact electric scooter designed for short to medium commutes, perfectly suited to the daily needs of college students

- Built over around 6 months from sketchbook to wheels on the road, within a budget of $1,000.
- Design goals:
  - **1)** Daily-commute range (≥ 5 miles per trip);
  - **2)** Highly portable and easy to carry;
  - **3)** Speed comparable to (or faster than) electric bicycles
- Specifications:
  - Range: 12 miles (20 km)
  - Folded Size: 25.6"x14.0"
  - Max Speed: 30 mph (48 kph)
  - Frame: laser-cut 5052 and 6061 aluminum, symmetrical mid-folding
  - Stem: 6061 aluminum tube, folds into thirds
  - Power: repurposed 9245 heavy-lift drone motor
  - Suspension: double 550lb rear shocks
  - Thermal: double heatsink with intake shroud



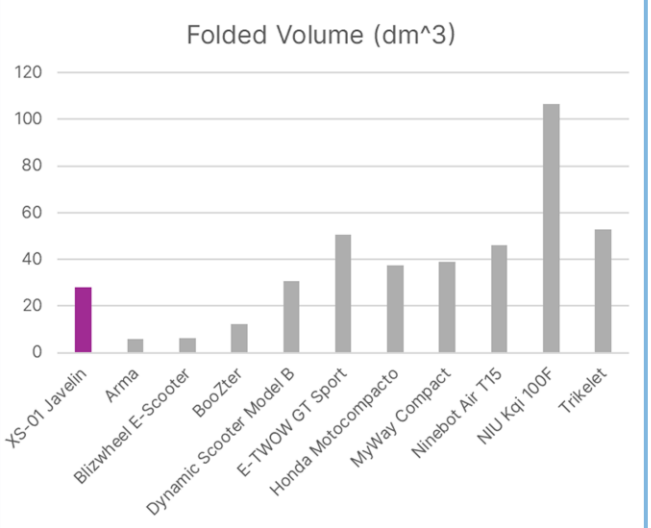


Folds in 4 easy steps!

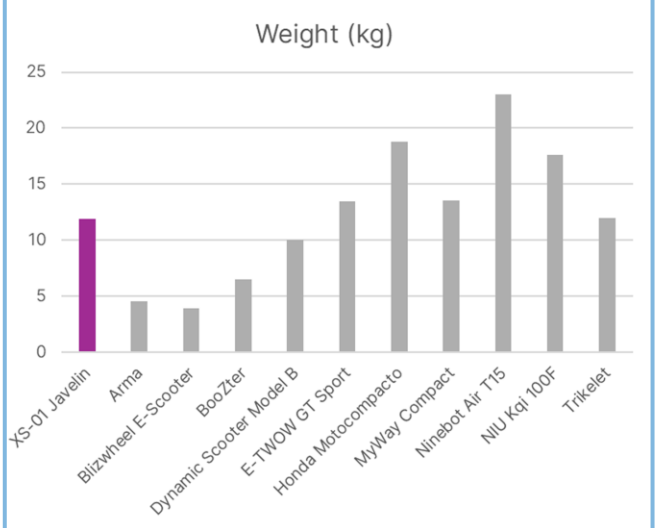
Performance Metrics

This design is optimized to achieve a high speed to size ratio, and this is reflected in the performance compared to other commercial scooters considered or marketed as "compact". Shown below are the physical specifications of my scooter compared with 10 other scooters.

Better

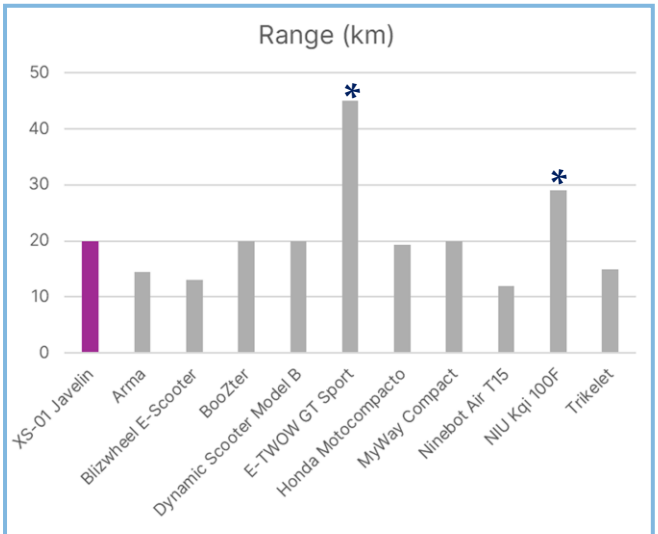


Top 30% against 10 commercial products.

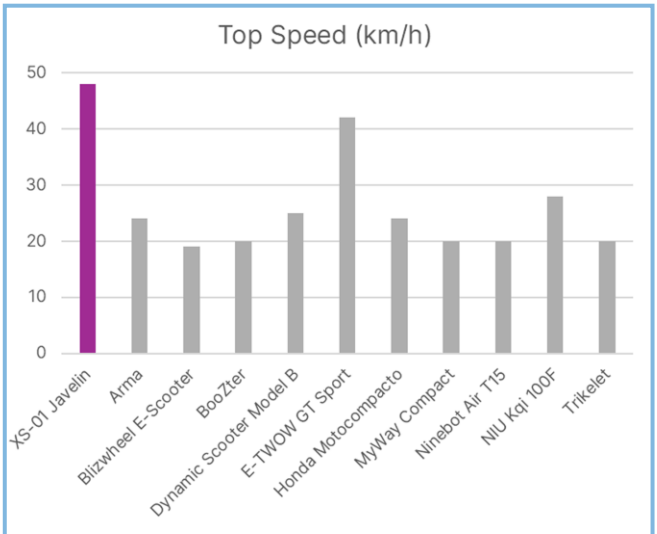


Top 50% against 10 commercial products.

Better



Superior or equivalent to 10 commercial products, except 2 less-compact products*.



Superior to all 10 commercial products

(Full tabulated data & Commercial product references)

Detailed Assembly

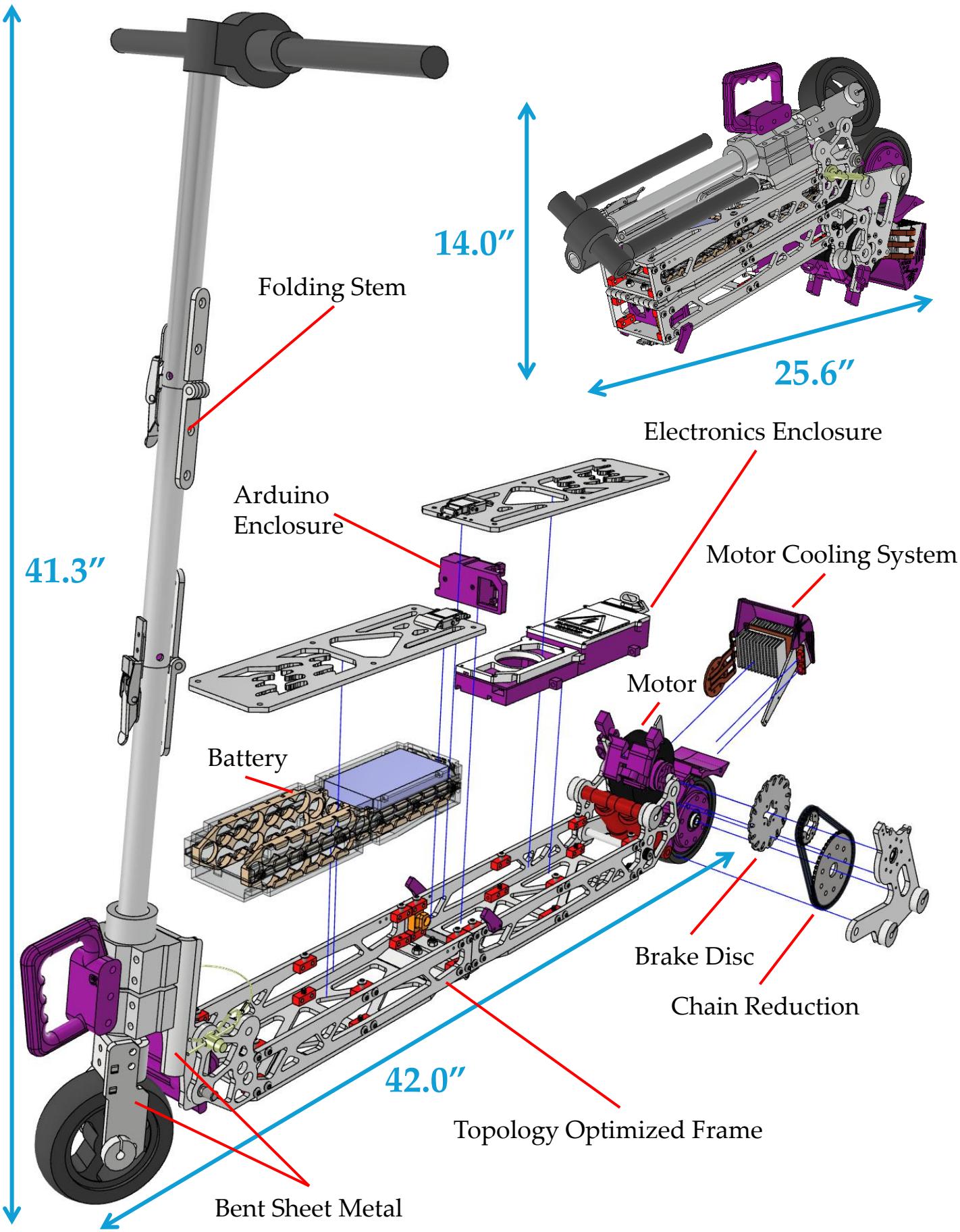
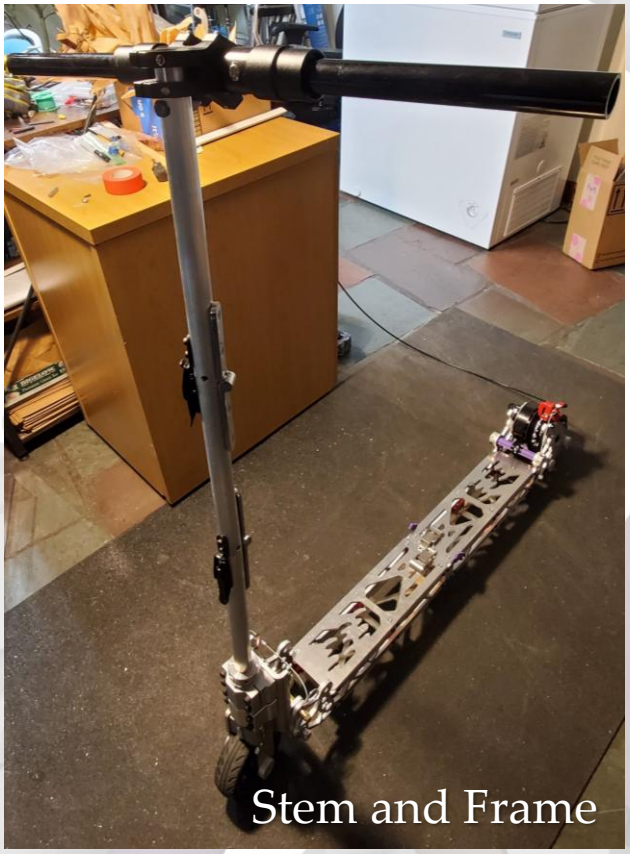
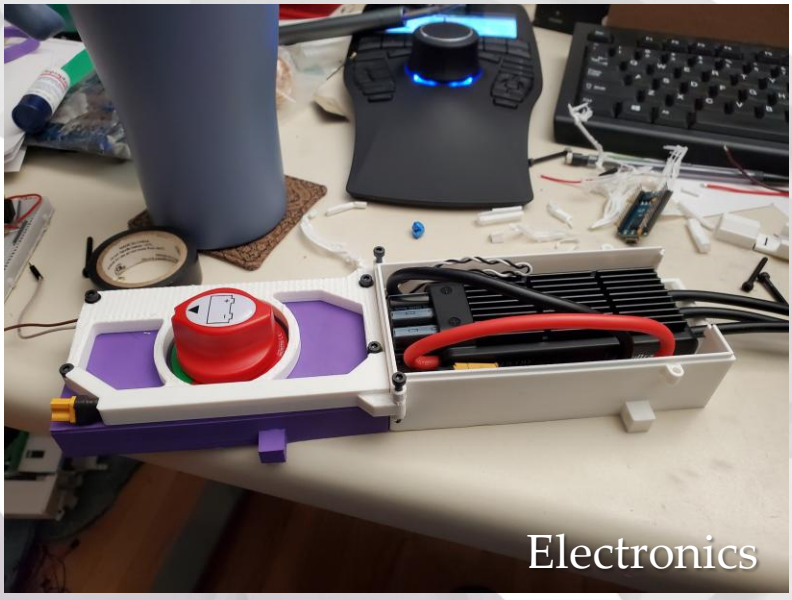


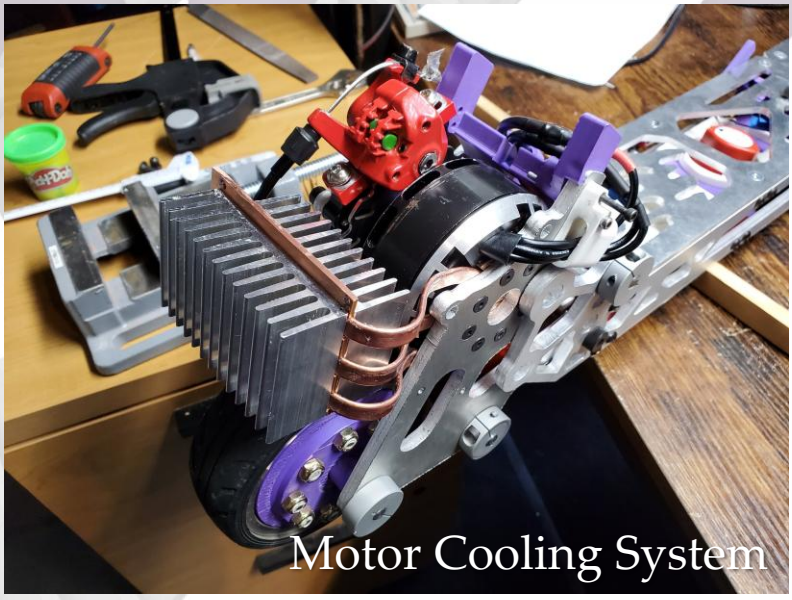
Photo Gallery – Individual Components


Stem and Frame


Electronics


Battery


Power Transmission

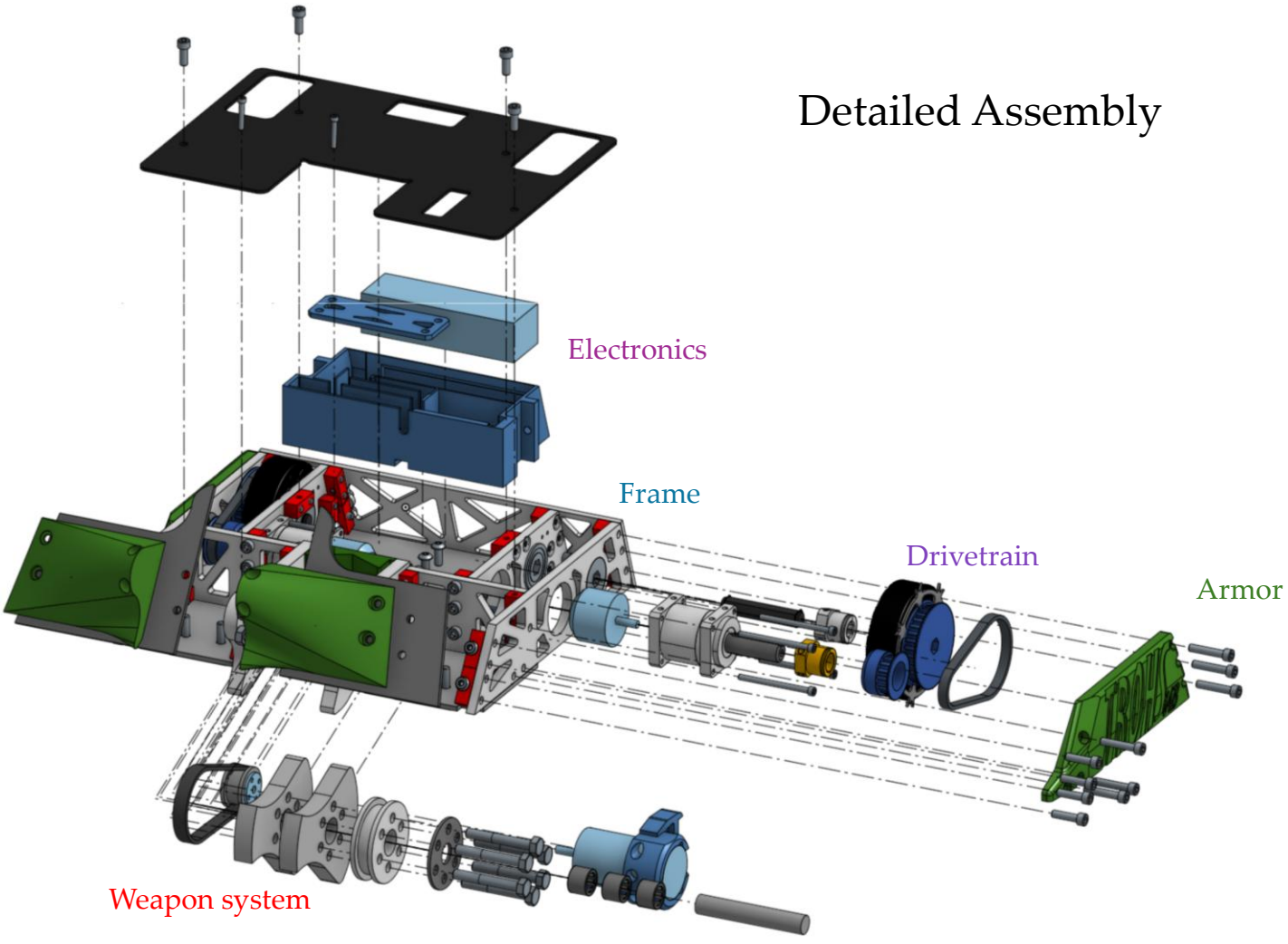

Motor Cooling System

Combat Robot (Link)

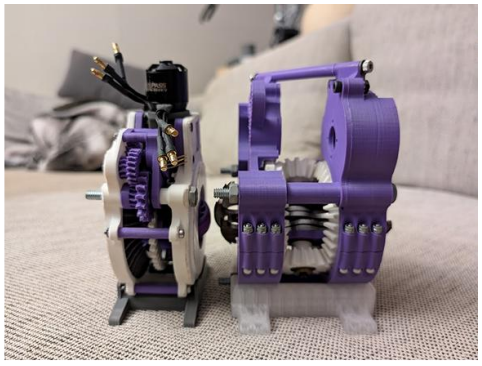
- Combat robot YOB TROHS
- Designed to compete in the National Havoc Robot League (NHRL)
- 12 lb. weight class; L11″xW12″xH2.5″
- Built from scratch over 5 months.

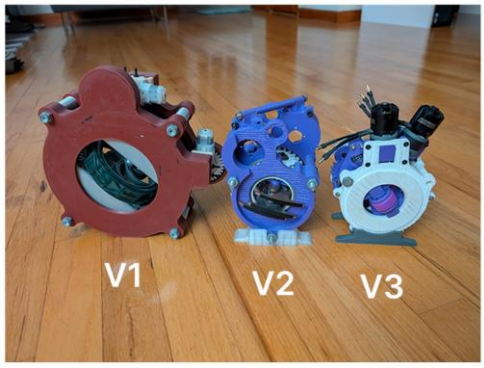
- Specifications:
  - Weapon: AR500 Vertical Spinner
  - Weapon Tip Speed: 300 mph
  - Drivetrain: brushless motor with gearbox and belt reduction
  - Competitions: 2 times

Detailed Assembly



Differential Swerve (Link)



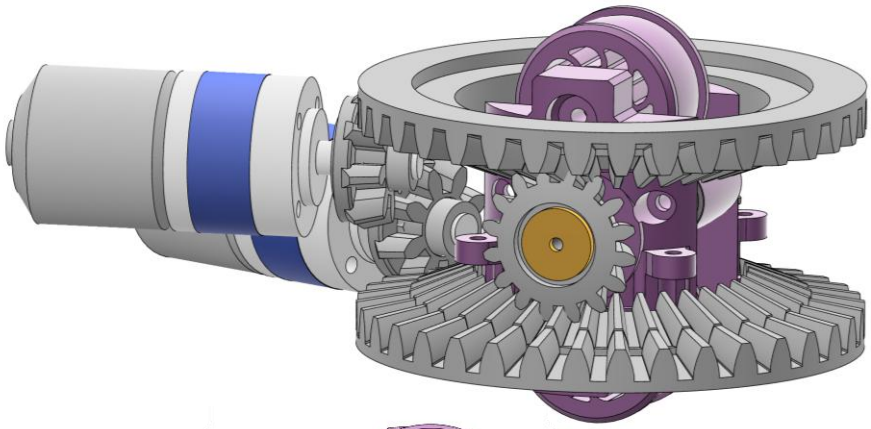


An experimental swerve drive designed for combat robotics, implementing differential swerve and shuffler technology.

A differential swerve enables true omnidirectional movement with twice the power of a traditional swerve design.

The current V3 design (refined from earlier V2 and V1 prototypes) is the smallest of its kind, implementing a unique compound bevel gear to minimize the vertical profile.

Detailed Assembly



Designed to maximize ease of access for repairs, critical in a combat setting.

- Specifications:
  - Drive Capabilities: full omnidirectional
  - Drivetrain: brushless motor with gearbox and gear reduction
  - Position Feedback: 1:1 absolute magnetic encoder