

# Tandem bike for autistic person (Team Tandem)

## Team Members:

Callie Mataczynski - *Team Leader*

Eric Arndt - *Communicator*

Aaron Wagner - *BWIG/BPAG/BSAC*

Mengizem Tizale - *On Co-op*

## Client:

Michael YuenHurwitz, Noah

## Advisor:

Professor Beth Meyerand

# Presentation Overview

- Problem Statement/Background
- Why should we care
- BME 400
- Specific Goals and timeline
- Other info
- Budget

# Problem Statement

- Our client is a man with autism
- Want to develop a tandem ebike
- Operated by an assistant
- Allows for client to exercise

# Background

- Autism
  - Developmental disorder
  - Difficulty with social interaction
- Three main components to this project
  - Frame
  - Resistance mechanism
  - User interface



<https://www.prioritybicycles.com/products/embarc>

# Why Should We Care?

- Autism should not hold back from life
- Health is important aspect of mental disease
- Project Focus Extends beyond this individual
  - Cerebral palsy
  - Muscular dystrophy
  - General Health



# Last Semester Recap

- Focused on the frame and resistance mechanism
- Good understanding of the design of our frame
- Resistance mechanism was a difficult process



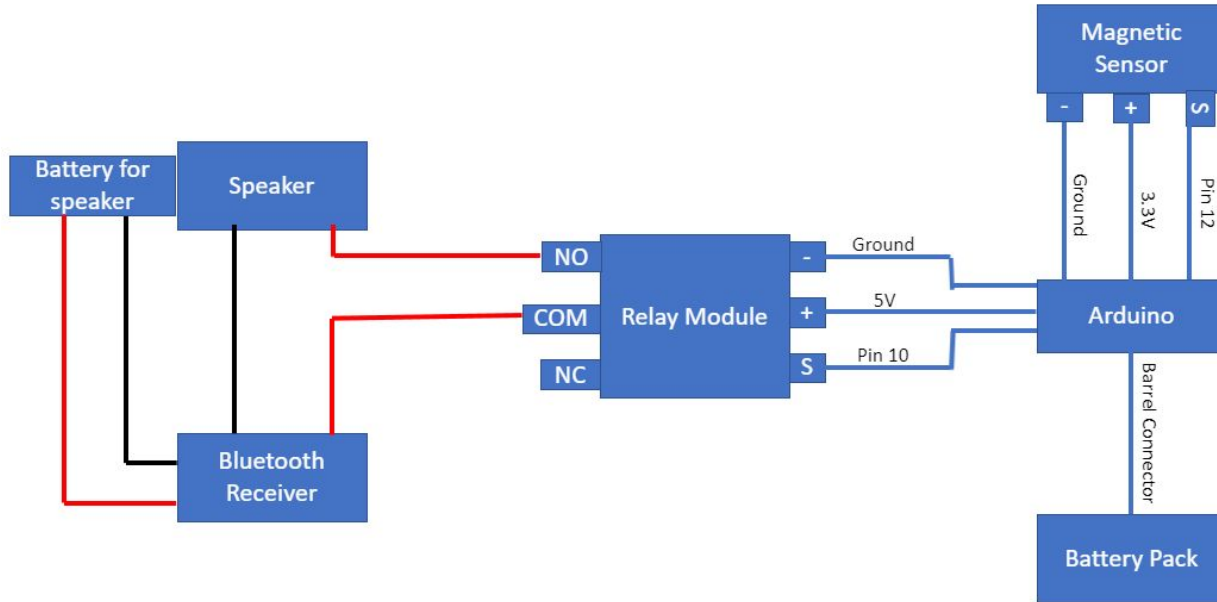
# Fabrication of Resistance Mechanism to bike

## -Materials:

- Stationary bike resistance mechanism
- $\frac{3}{8}$ " fine thread bolts (5)
- 1.5" by 5 ft aluminum rod (brackets)



# Fabrication of bluetooth circuit



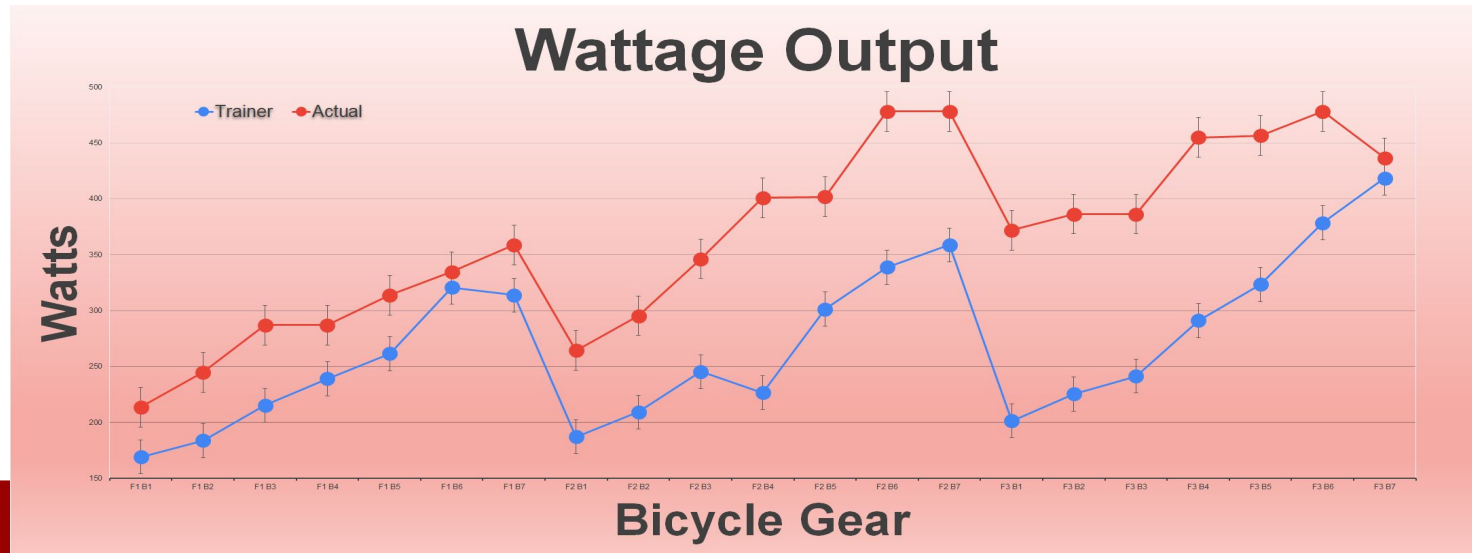
## Materials:

- Bluetooth Speaker
- Bluetooth receiver
- Relay Module
- Arduino Uno
- Magnetic Sensor
- Magnet
- Battery pack
- 28 gauge wire
- Solder
- Shrink wrap
- Heat gun



# Testing

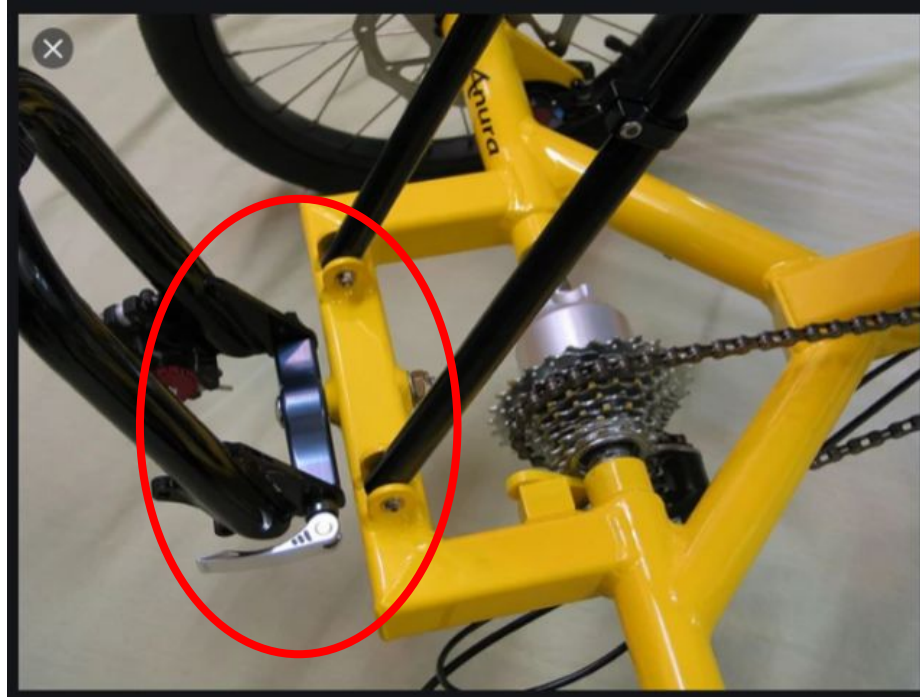
- Demonstrated that the wattage output of riding an actual bicycle is similar to the wattage output from a resistance mechanism
- Furthermore, a survey was taken analyzing the comfortability and feel of a real bike. Noah's bike scored 7/10 on both categories.



# Final Design



# Future Work - E Bike Purchase and Attachment



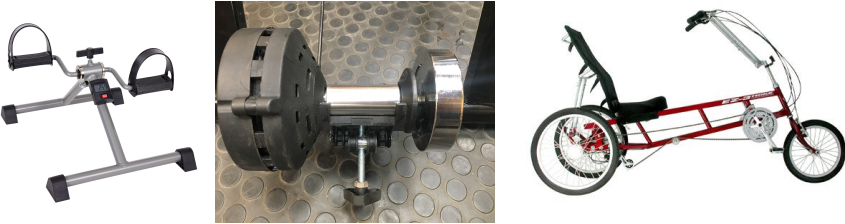
# Future Work - Miscellaneous Attachments



# Future Work - Seat Belt



# Budget: \$5,000

Items	Cost	Adjusted Budget
	\$557.52	\$4,442.48
Audio Feedback System	\$67.84	\$4,374.64
Resistance Mechanism Components	\$101	\$4,273.64
Other parts	\$129	<b>\$4,144.64</b>



# Acknowledgements

- Clients: Michael YuenHurwitz, Noah
- Advisors: Professor Beth Meyerand, Dr. Christopher C. Luzzio

# References

- “PRIORITY EMBARK E-BIKE.” *Priority Bicycles*, <https://www.prioritybicycles.com/products/embark>.
- “What Is Autism?” *Autism Speaks*, <https://www.autismspeaks.org/what-autism>.