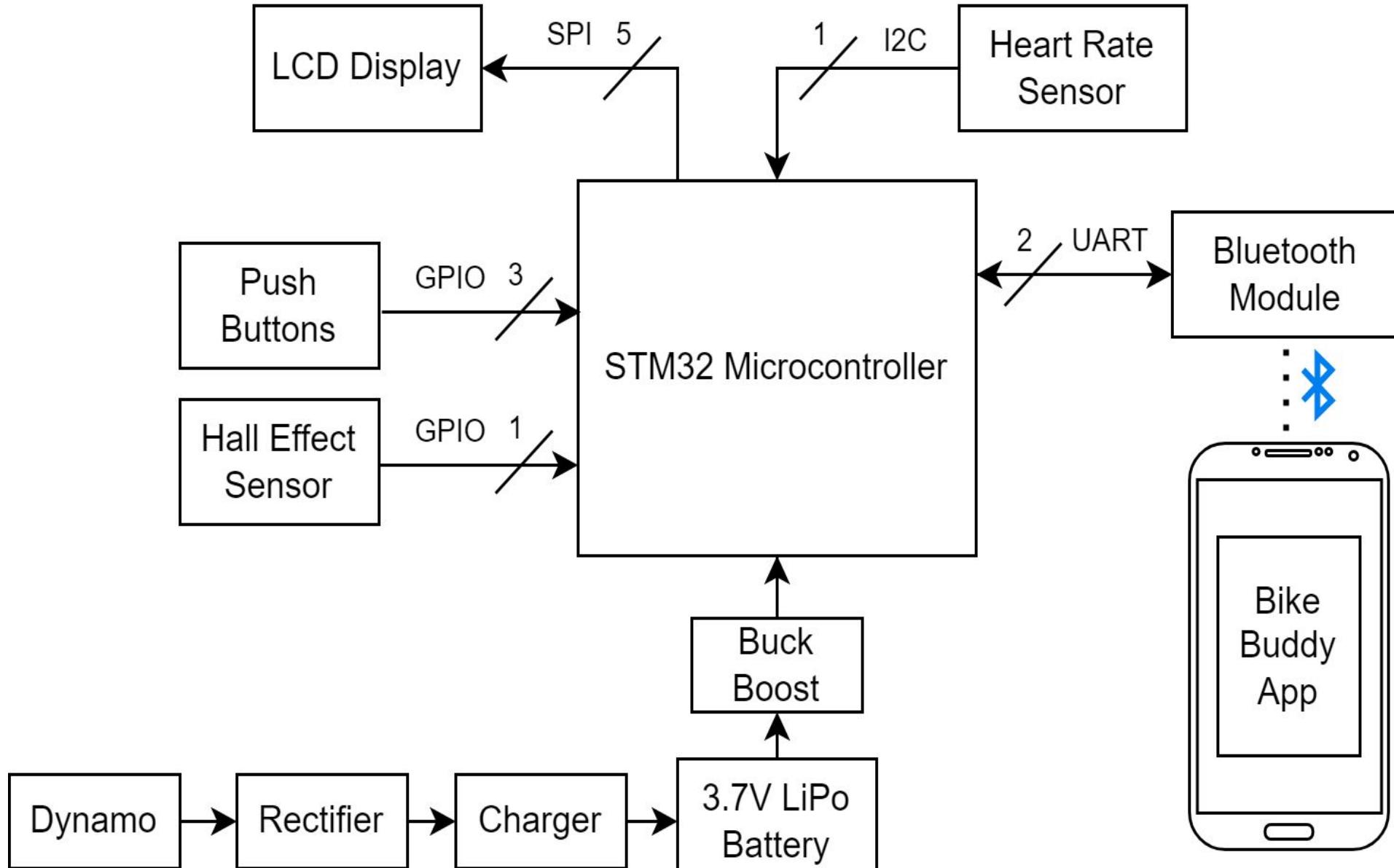


ECE 477 FINAL REVIEW: TEAM #11

OUTLINE

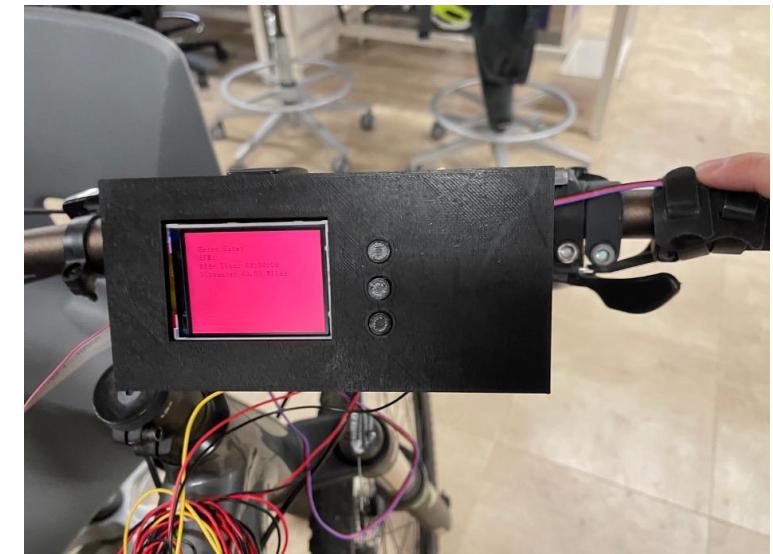
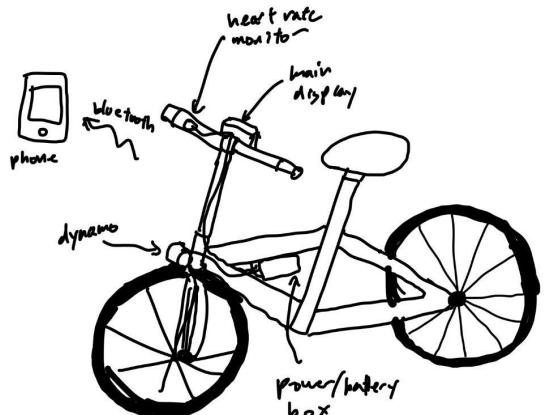
- Project Overview
- Block Diagram
- Design Challenges
- Individual Contributions
- Project Video Demonstration
- Questions

BLOCK DIAGRAM



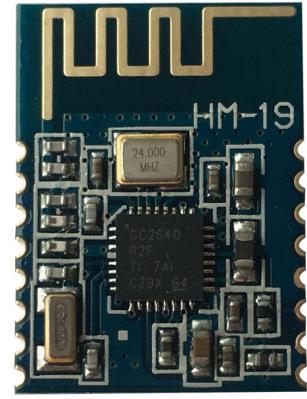
PROJECT OVERVIEW

- A standalone kit to upgrade a normal pedal bicycle to a smart bike
- Capable of tracking, displaying, and storing basic fitness metrics including distance, speed, and heart rate
- Fitness data transferred to a user's phone via bluetooth, accessible via app
- Self powered with dynamo to charge a lithium-polymer battery



DESIGN CHALLENGES

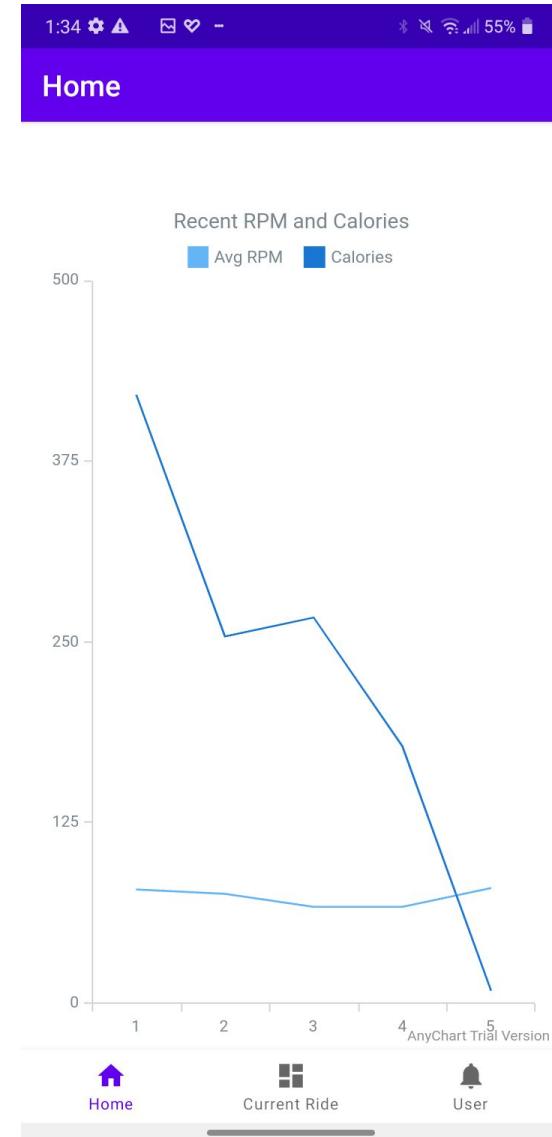
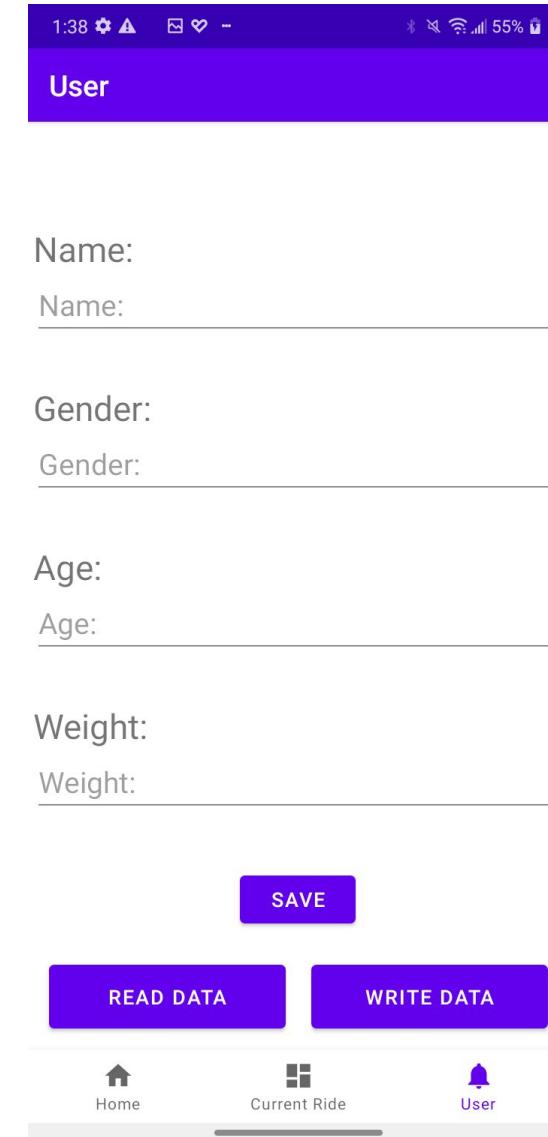
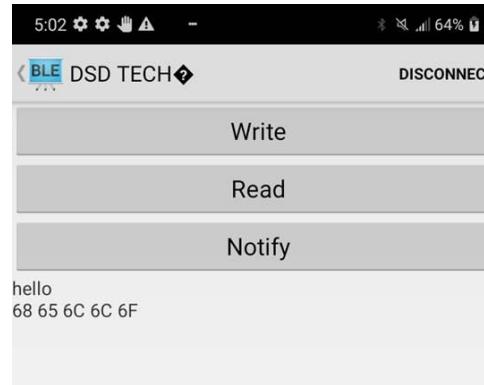
- Bluetooth Module
 - Poor documentation
 - Long hours debugging read/write code
- Sensor mounts
 - Creating a secure mount on the bicycle
 - Finding a good position to make reliable measurements
- Heat rate sensor
 - Reliably reading pulses
 - Processing the signal



INDIVIDUAL CONTRIBUTIONS

Joseph Kawlock

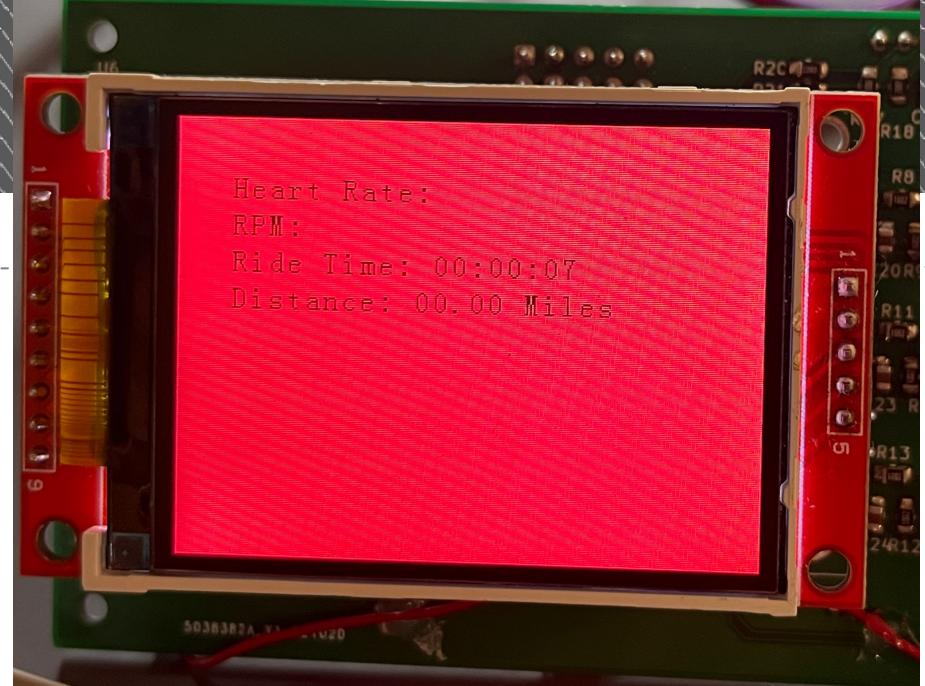
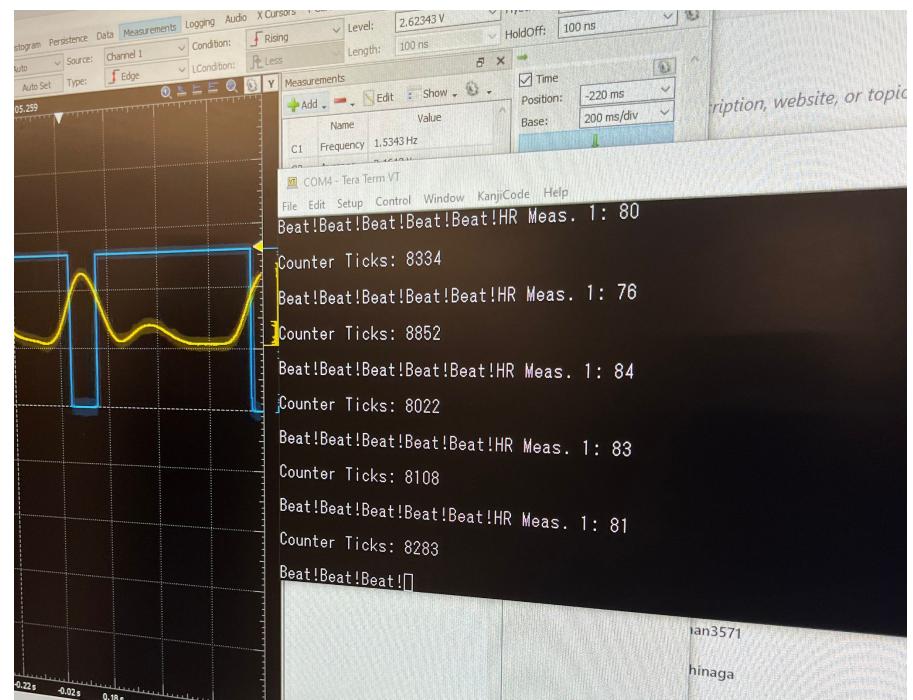
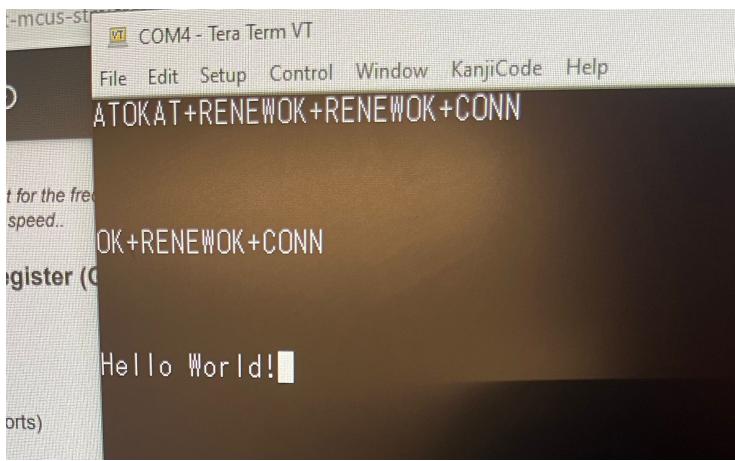
- Bluetooth
 - Initial setup
 - Lab testing
- Mobile Application
 - BLE read & write
 - User input
 - Google Fit store
 - Graphical display



INDIVIDUAL CONTRIBUTIONS

Michael Srinivasan

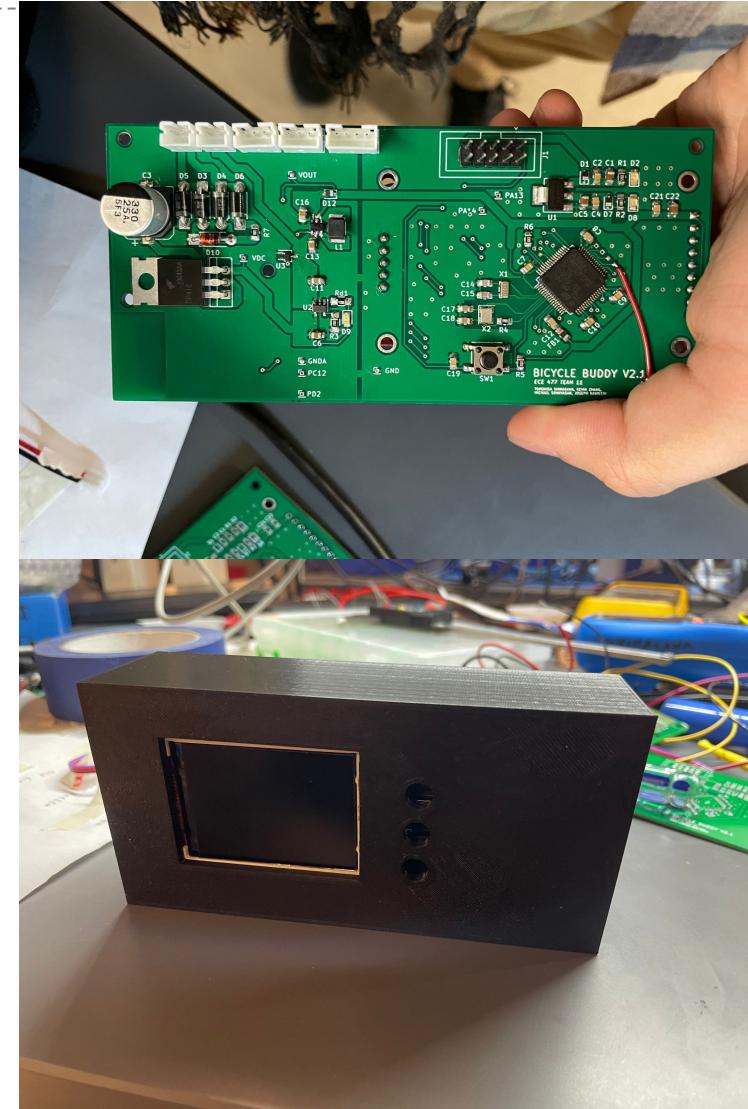
- Worked primarily in firmware
 - Sensor Data Processing
 - RPM data
 - HR data
 - LCD Setup
 - Metric Rendering and Calculation
 - State Design
 - BLE Module
 - Helped in early BLE code development



INDIVIDUAL CONTRIBUTIONS

Tomohisa Shinagawa

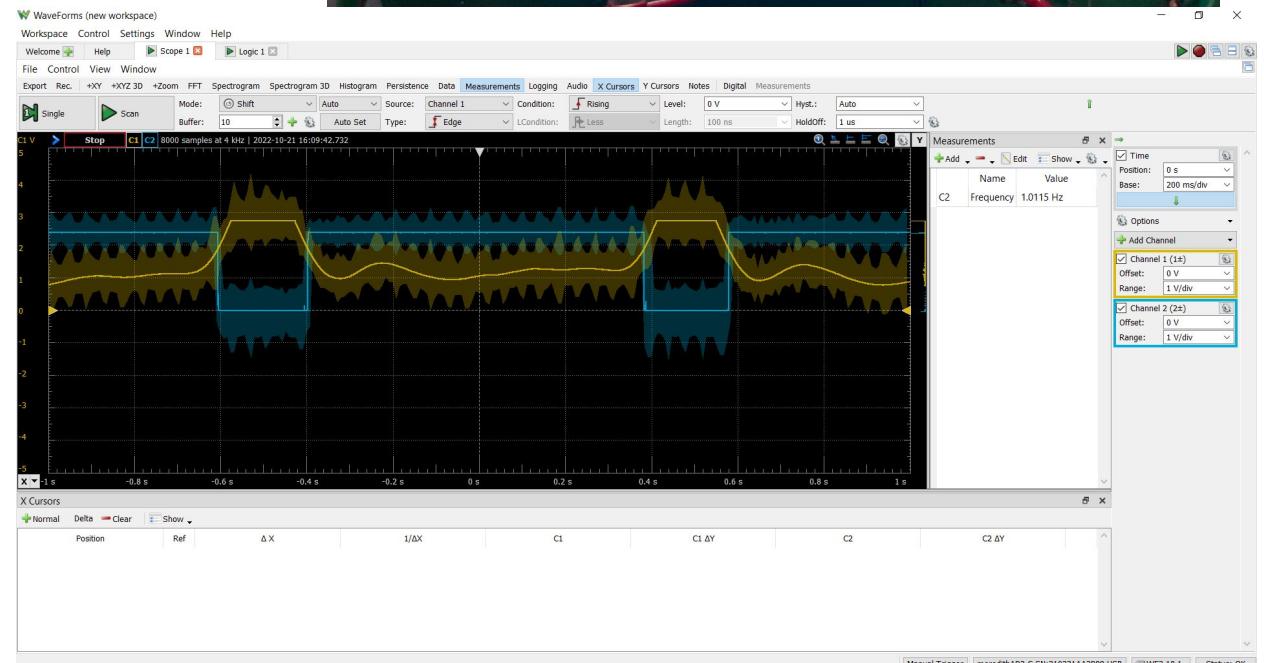
- Primarily Hardware
 - Prototyping
 - Breadboard Level
 - IC Evaluation
 - PCB Design
 - Design in KiCad
 - Manufacturing
- Packaging Design
 - CAD Design
 - Design in Fusion 360
 - Manufacturing
 - 3D printed and adjusted for tolerance



INDIVIDUAL CONTRIBUTIONS

Kevin Zhang

- Firmware
 - Bluetooth
 - Establishing connection
 - Send/receive functionality
 - Communication Protocol
 - Serial UART
 - Sensor interfacing
 - Heart rate
 - Hall effect
 - Code integration
- Peripheral Hardware
 - Heart rate comparator circuit
 - Hall effect sensor evaluation



PROJECT DEMONSTRATION

PSSC #1: An ability to measure the user's heart rate via an optical sensor

PSSC #2: An ability to harvest mechanical energy to charge a battery via rectifier

PSSC #3: An ability to send data to a Bluetooth module

PSSC #4: An ability to measure rpm data using a hall effect sensor and a magnet

PSSC #5 An ability to output ride metric data using an LCD interface through SPI

Video



Questions?