

OVERVIEW

- Design and Build two low cost force plates that can be used to evaluate biomechanical asymmetry in Grove City College Athletes

APPLICATIONS

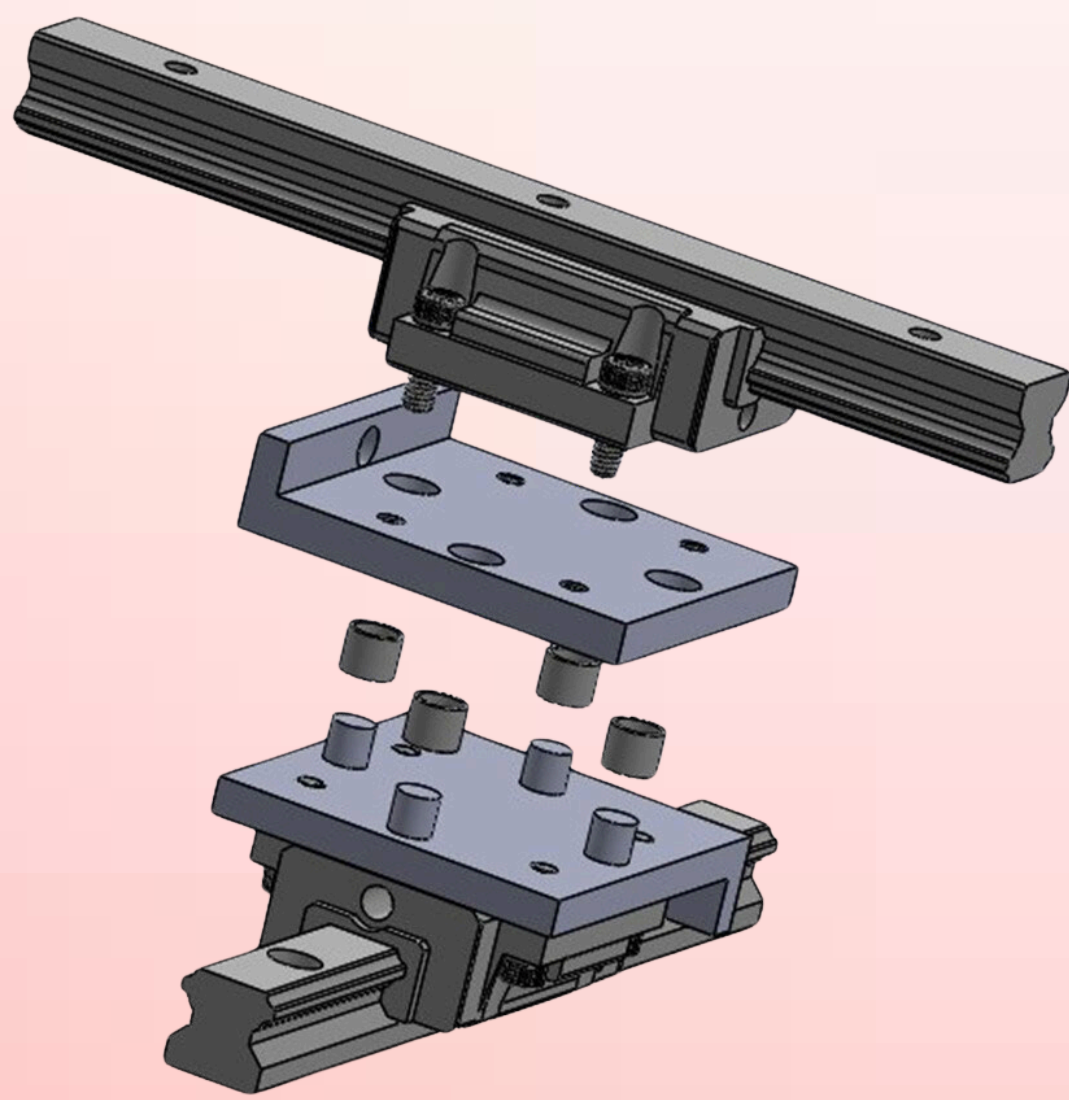
- Biomedical Research
- Physical Therapy
- Athlete Training

OBJECTIVES

- Five Sensors that give ability to measure in X,Y,Z directions
- Made of 6061 T651 Aluminum
- Measures horizontal forces without being skewed by a moment
- Detailed electronic setup to increase sampling rate (roughly 200Hz)
- Use ground reaction forces applied from balancing or squatting
- Provide insight on users feet, knees, tendons, and more

VERTICAL FORCE ABSORPTION DEVICE

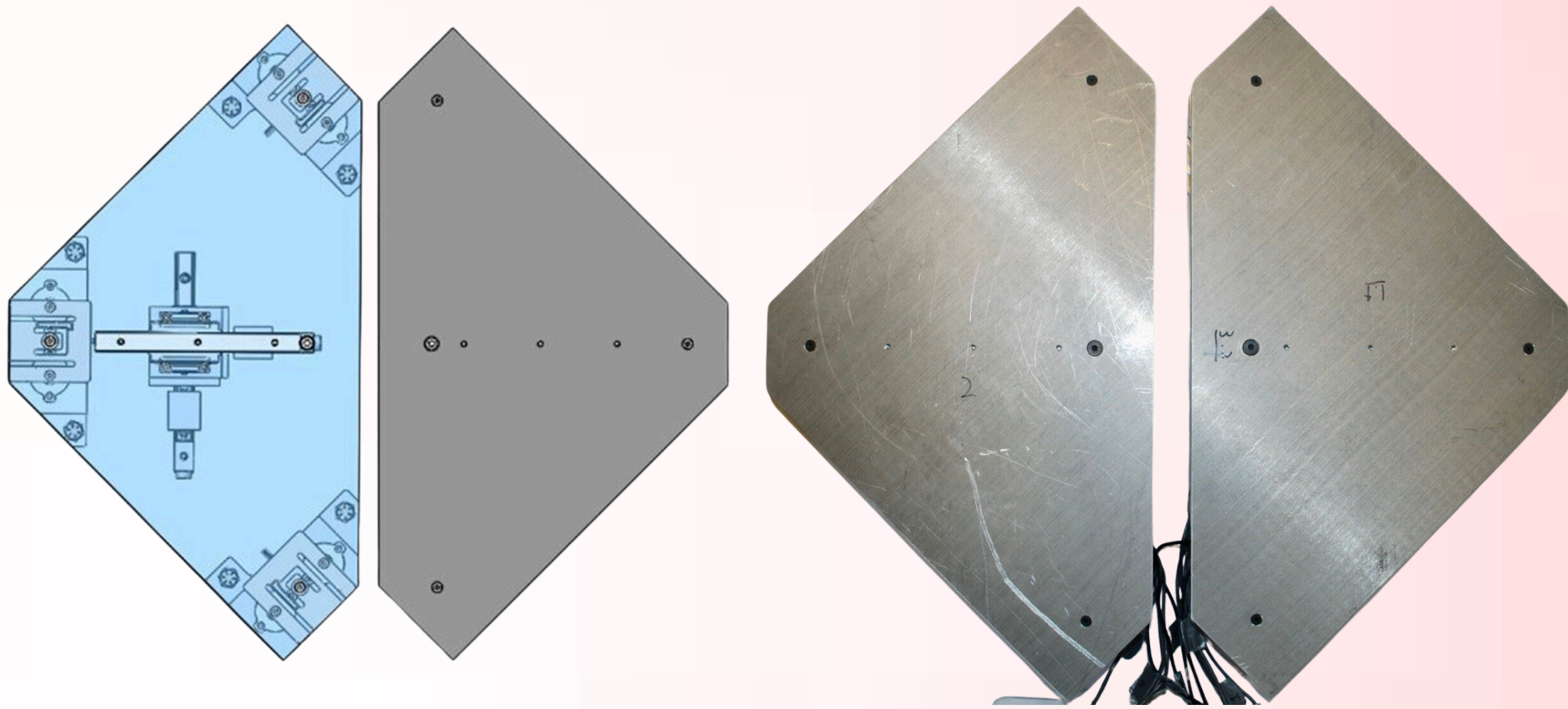
- Used to eliminate forces applied on rail system at center of plate
- Focuses forces on all three corner sensors
- Measures Horizontal forces using two additional sensors



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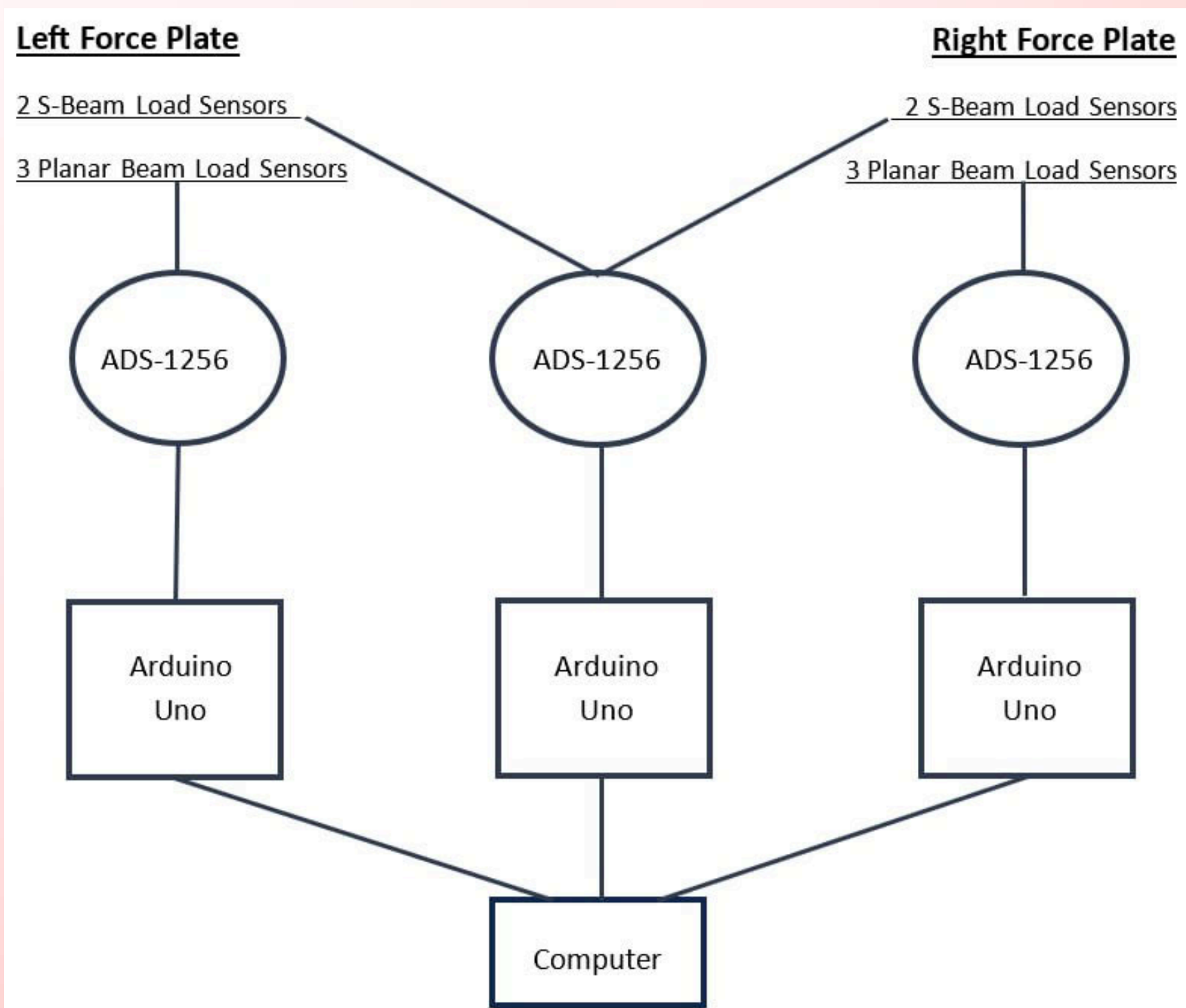
BUILD SYSTEM

- Measures forces in all directions using 5 sensors, 3 vertical, 2 horizontal
- Horizontal forces via track based system with S-Beam sensors
- Vertical forces via planar beam sensors

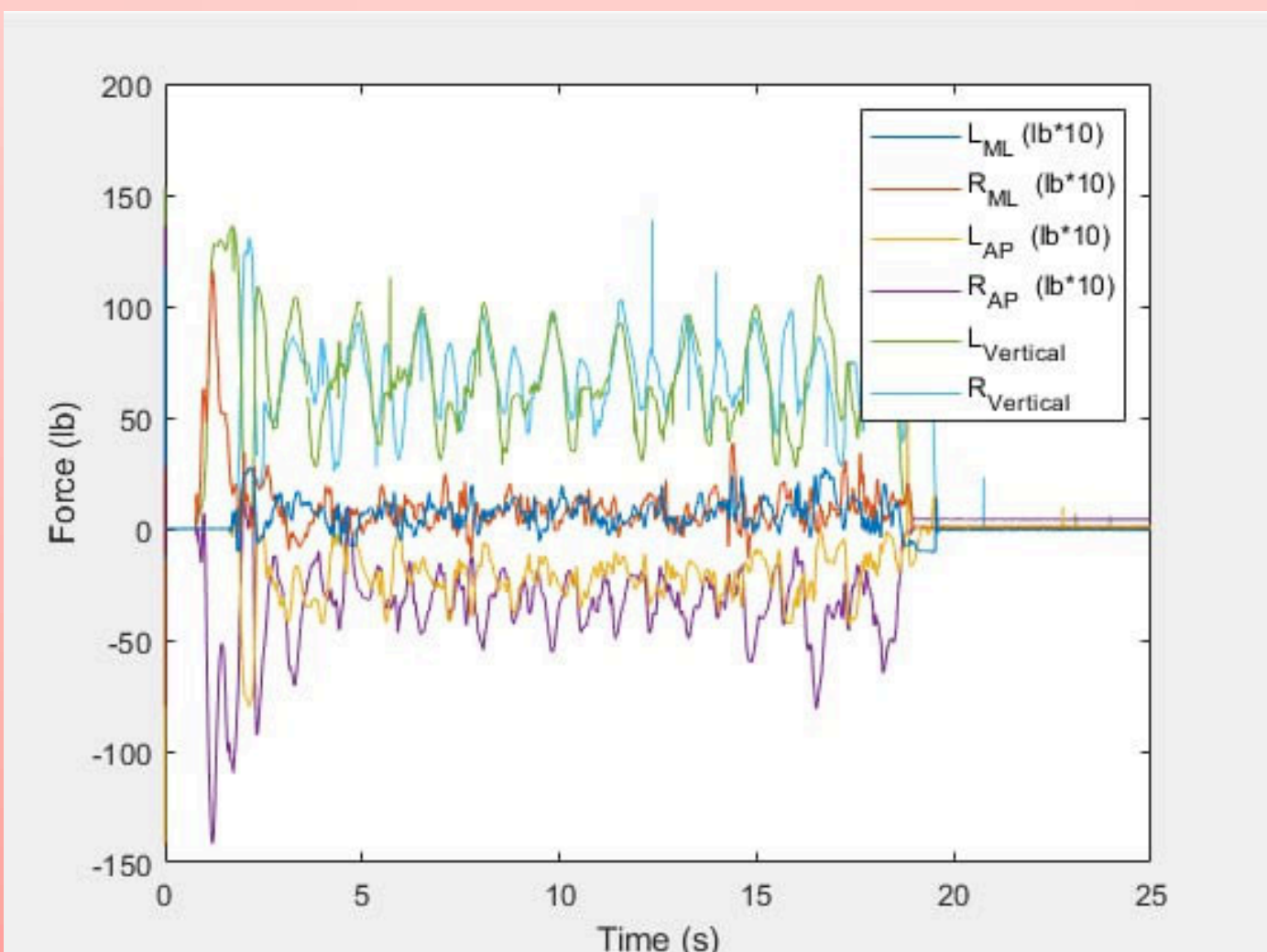


ELECTRONICS

- ADS-1256 Amplifiers
- Arduino Code to communicate with amplifiers
- C-Sharp code to output data to CSV file
- Python code for live graphs



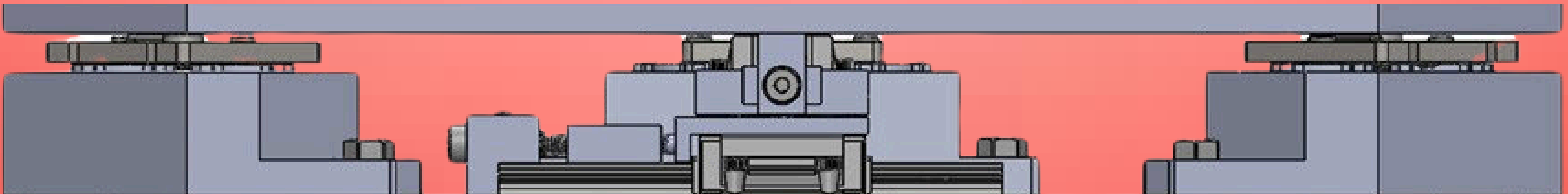
PILOT DATA



- 10 body weight squats performed
- Light Blue/Green total vertical force
- Purple/Yellow right to left forces (outward is negative)
- Dark Blue/Orange front to back forces (forward is positive)
- Each rise and fall in vertical force represents one squat

NEXT STEPS

- Research in 2024-2025 School year and beyond!



Side View: One Plate