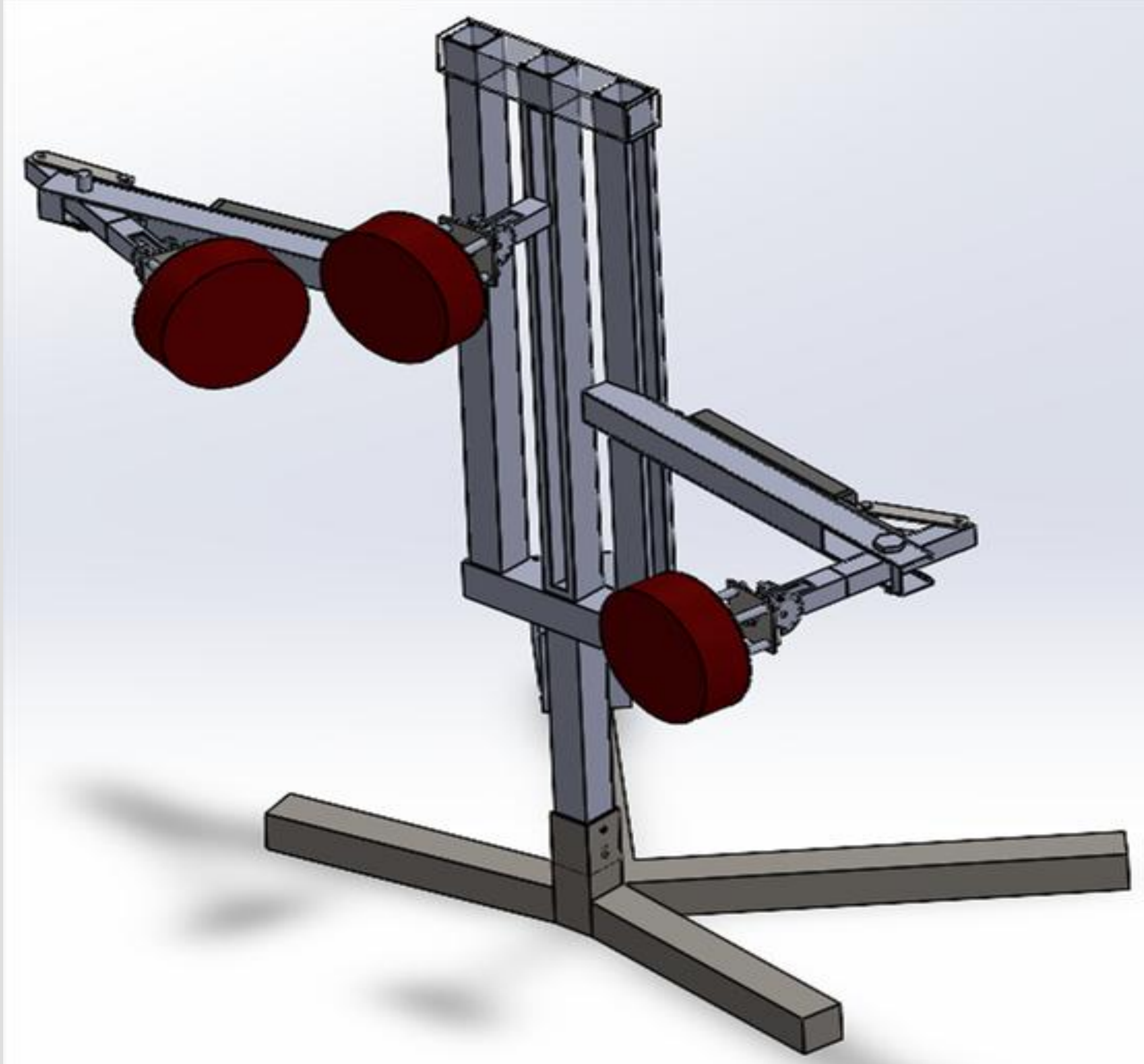
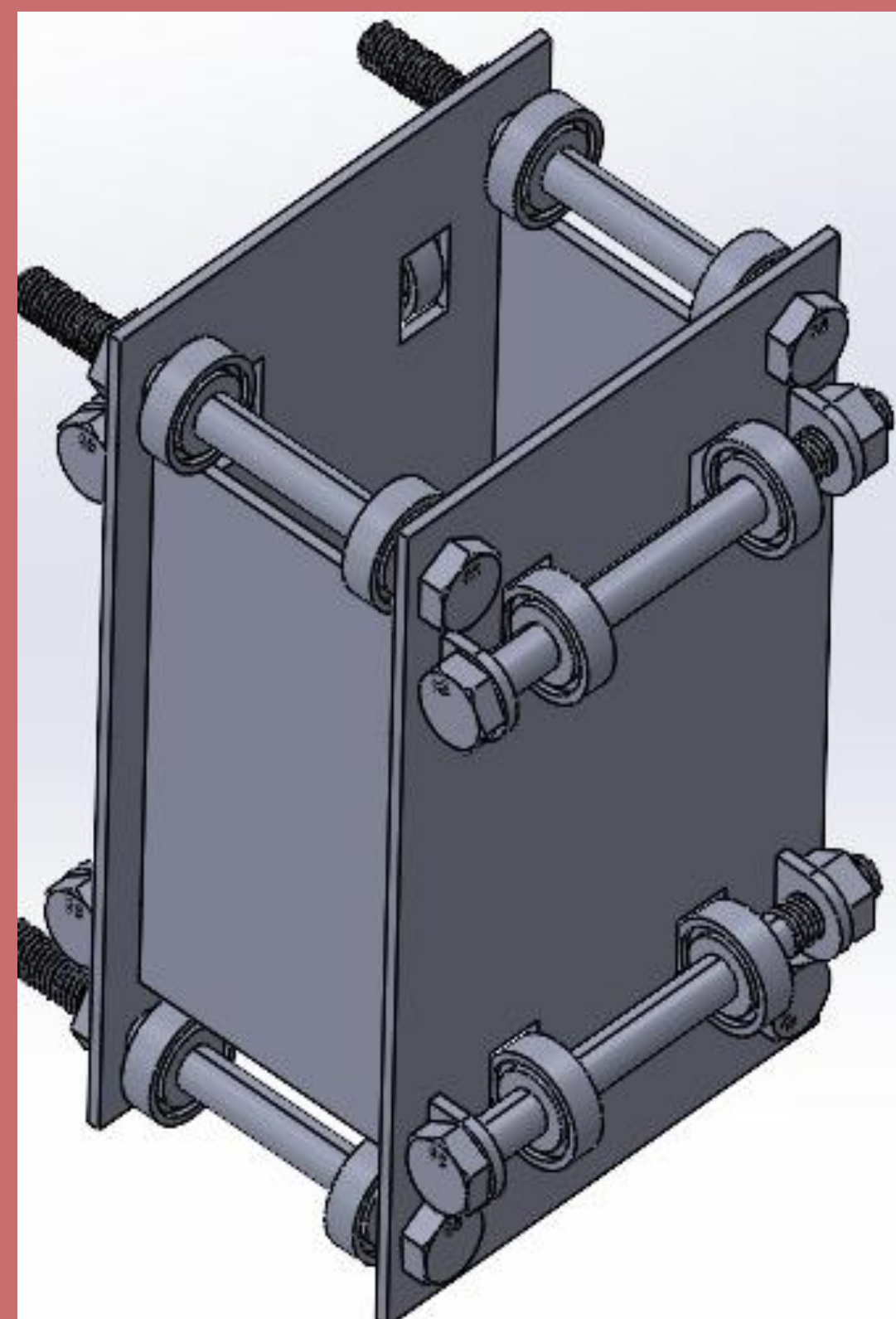


## Final Design



The device connects via built-in Wi-Fi and is controlled through a browser—no app needed. Multiple users can access it at once to run sessions, view live data, and adjust settings. Data is stored on an SD card or USB drive and can also be downloaded wirelessly.



A rectangular trolley moves vertically using a power screw and roller bearings for smooth, stable motion. A fixed support system prevents bending, with bearings spaced by washers and secured with a 1/2-inch brass rod.

# Taekwondo Kicking Stand

Team 10 Members: Analise Wojciechowski, Lucas Meyers, Adin Bohn, Benjamin Lukasik, Kyle Belian, Trevon Gunter

Sponsor: Kleineffeor

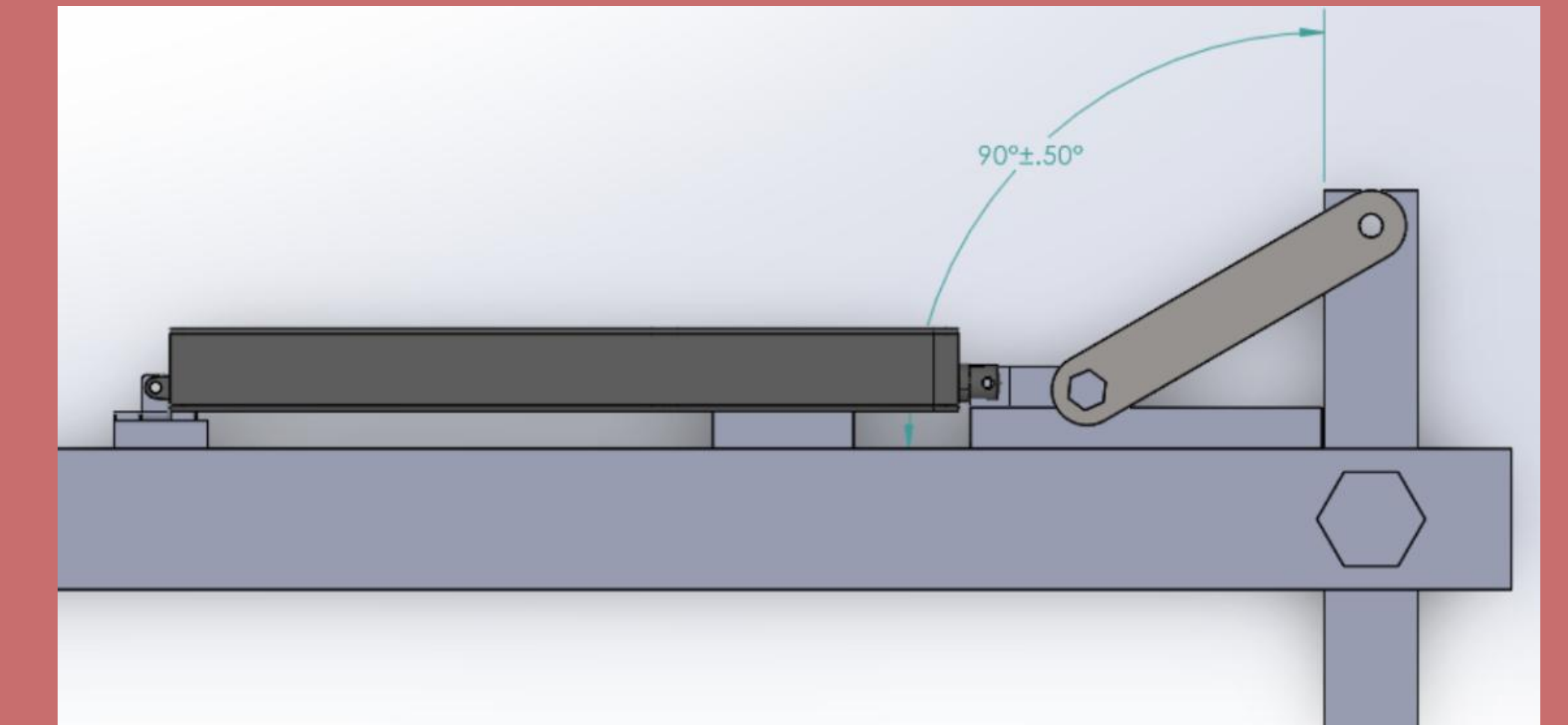
Faculty Advisor: Dr. Pung

## Project Overview

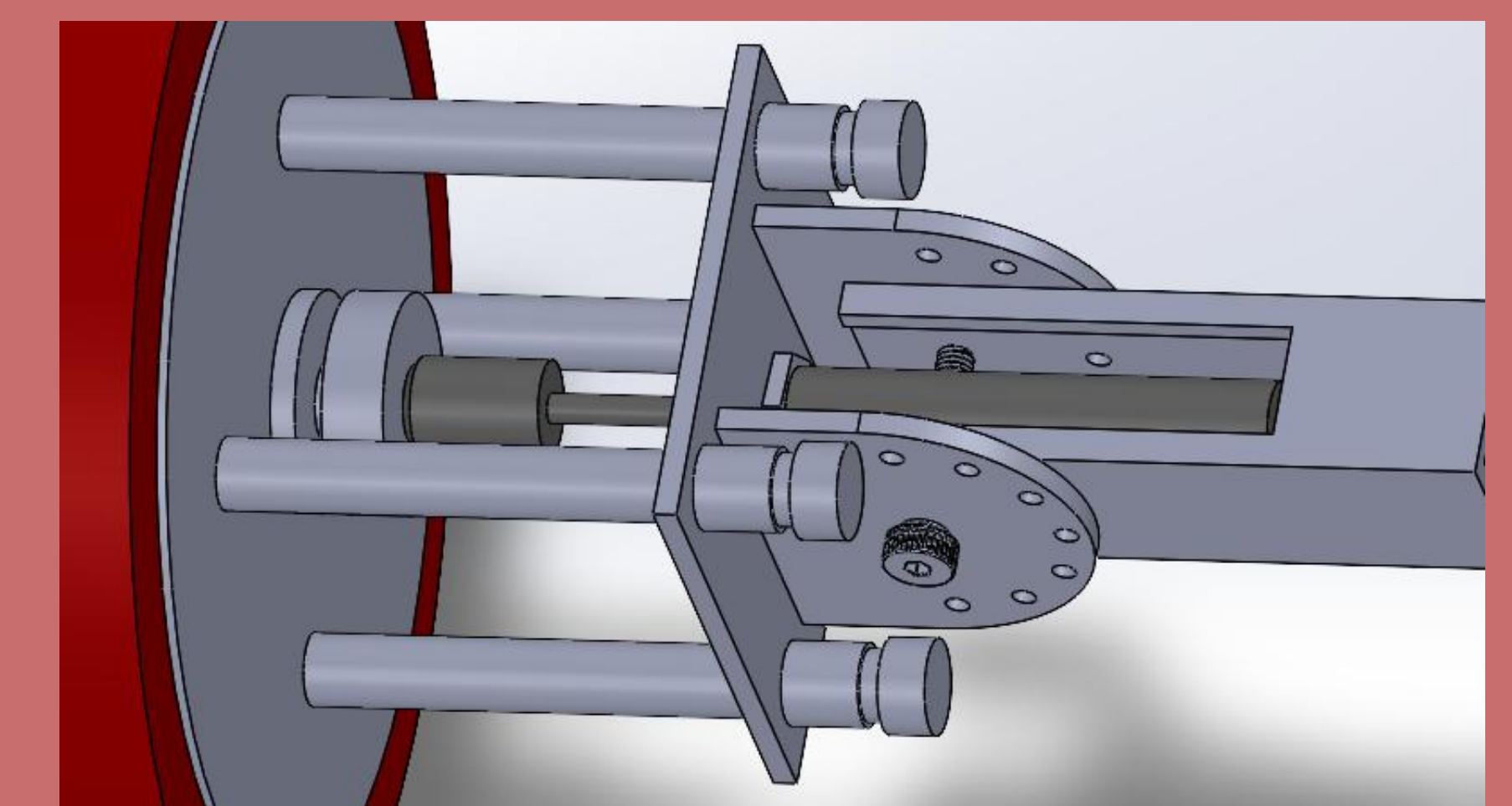
Kleineffeor is developing an advanced Taekwondo training system featuring three adjustable kicking targets that move both vertically and rotationally based on user input. Each target includes sensors that measure impact force and strike timing, with data displayed in real-time and available for download. Users can create and save personalized training sequences through a web-based interface supporting multiple profiles. The system's unique combination of automated target movement, integrated force tracking, and customizable training options offers a data-driven approach to martial arts training. Key features include motorized vertical and rotational adjustments, manual horizontal rotation, force data display, and durable construction using standard fasteners to ensure long-term reliability.



GRAND VALLEY  
STATE UNIVERSITY



The arm rotates using a 6-inch linear actuator and a 7.5-inch aluminum slide. This setup allows the arm to move between 90° and 150°. Two coupler links connect the slide to the arm, which is held in place with a 1-inch bolt. A thrust bearing at the joint ensures smooth motion without metal parts grinding together.



The damping system reduces impact force to protect the machine and user. A foam-padded circular target absorbs kicks and is connected to a shock absorber that compresses to reduce impact energy. Guide rods keep the motion straight and stable. A load cell behind the target measures the force of each kick, allowing for accurate data collection.