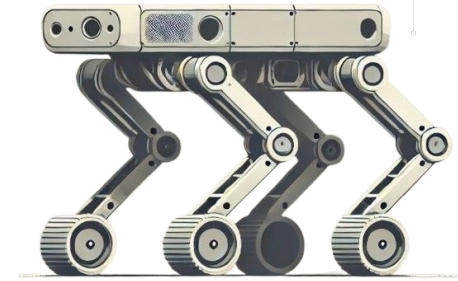


# WALT



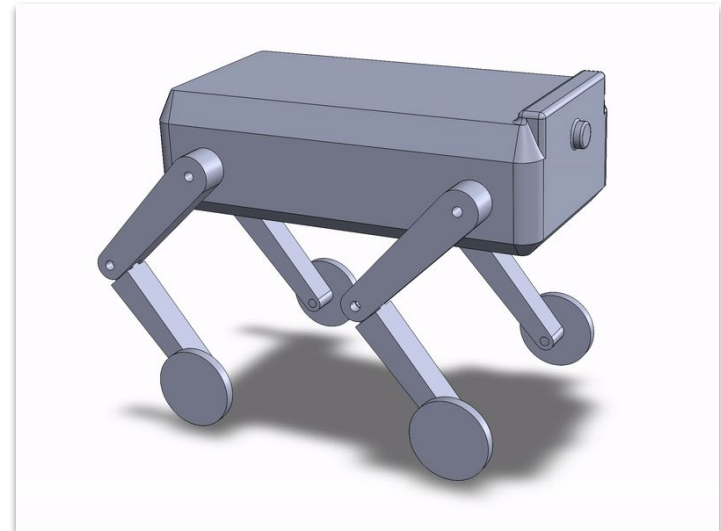
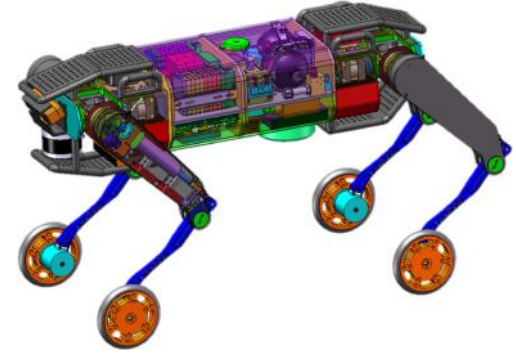
Wheeled Autonomous Locomotion Traveler

Leon Greiner, Vineeth Parashivamurthy,  
Yichen Hu, Yitong Wu, Zichu Zhou

# Idea and Basic Concept

## Autonomous Wheeled Quadruped Robot

- **Dual-Mode locomotion:**
  - Walking/Climbing mode
  - Driving mode
- Each foot is equipped with **powered wheels**, that can be locked in walking mode
- **8-DOF** Leg System with 4 Powered Wheels



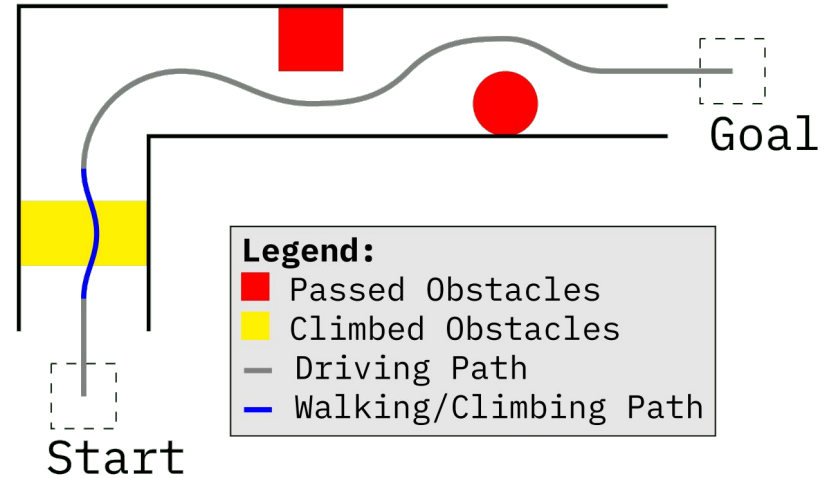
Our first walking animation of a trot gait

# Objectives

**Objective 1:** Basic locomotion and mode switching.

**Objectives 2:** Autonomous stair detection and climbing.

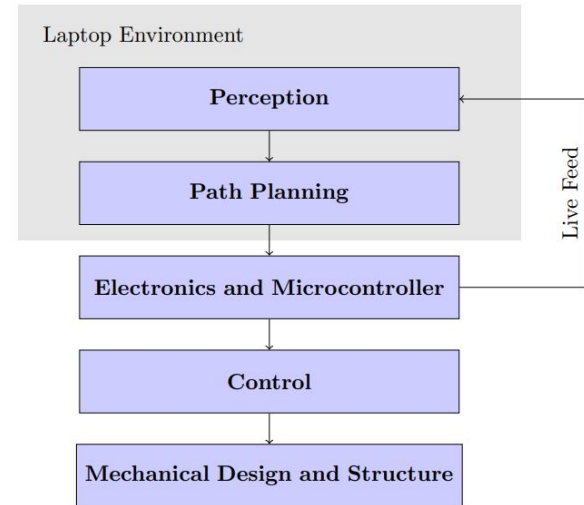
**Objectives 3:** Autonomous driving and climbing with integrated obstacle avoidance and path planning.



# Major Technical Challenges

## Control and Sensing for the walking/climbing gait

- **Detection** of obstacles with limited computational power.
- **Multi-Sensor** interfaces & synchronization (LiDAR, camera, and IMU).
- **Control** (adaptation) of the gait from sensor data.
- **Real-time feedback** on latency and response times to ensure on time communication between sensors and actuators for effective environmental awareness.



# Timeline & Distributions

## Hardware Design & Manufacturing

- Yichen, Zichu
- Electronics housing, actuator mount, leg mechanism, etc.
- By Week 4 (Sep 29th) design finished, by Week 6 (Oct 13th) body-leg assembly.

## Sensing & Electronics

- Vineeth, Yitong
- LiDAR, Camera, etc.
- Ongoing research, complete data collection by Week 5 (Oct 6th). Complete electronics assembly by Week 8 (Oct 27th).

## Path Planning & Control

- Leon, Yichen, Zichu
- Path-panning, Control, through Python
- Forward kinematics walking by Week 6 (Oct 13th), decision-making by Week 8 (Oct 27th), autonomous climbing by Week 10 (Nov 10th).

