

# Tund Theerawit

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## EDUCATION

University of Wisconsin-Madison

Graduation date: *May 2027*

B.S. Mechanical Engineering

Research Focus: Embodied AI, Differentiable Simulation (JAX), Reinforcement Learning.

GPA: **3.83 / 4.0**

## RELEVANT COURSEWORK

Data Science Programming I & II (Python) • Linear Algebra • Differential Equations • Dynamics Systems • Geometric Modeling • Statistics

## SKILLS & INTERESTS

**Programming:** Python, C++, PyTorch/JAX, Git, Linux/Bash

**Machine Learning & Simulation:** JAX/MJX (Differentiable Physics), Reinforcement Learning (PPO), Sim-to-Real Transfer, Domain Randomization, Massive Parallel Simulation, Policy Optimization, Custom Reward Design, MuJoCo (MJX), Robot Kinematics & Dynamics

**Robotics:** ROS 2, OpenCV, Mechatronics Integration, PCB Soldering/Debugging

**Tools:** SolidWorks, Physics Engines

## SUMMARY

Mechanical Engineering student at UW–Madison with hands-on experience building physics-accurate digital twins and training reinforcement learning policies for legged locomotion. Specialized in domain randomization, reward shaping, and Sim-to-Real transfer using MuJoCo (MJX/JAX) on the Pupper quadruped platform. Passionate about leveraging differentiable physics to accelerate high-DoF robot autonomy.

## EXPERIENCES

**LeggedAI Lab** | Madison, Wisconsin, United States

**May 2025 – Present**

Department of Mechanical Engineering, [leggedai.com](https://leggedai.com)

Robotics Engineer Undergraduate Researcher

- Developed a **massively parallelized simulation pipeline** using **JAX/MJX**, enabling the generation of millions of interaction steps per second to train locomotion policies significantly faster than real-time.
- Engineered **Sim-to-Real pipeline** with domain randomization and PPO policies. Overcame jerky, inefficient motion by **designing custom reward functions** (velocity tracking, torque penalties, smoothness constraints) to achieve stable 0.75 m/s forward-velocity tracking with a 10% reduction in simulated energy consumption.
- Built a **hardware-in-the-loop "Digital Twin"** pipeline to validate simulation fidelity, visualizing real-time sensor data against physics model predictions to identify and correct dynamics mismatches.
- Diagnosed rear-leg motor failure during critical testing and **avoided ~2 weeks of stalled progress** by re-architecting the robot to a 3-legged morphology and retraining a PPO policy, enabling **zero-shot recovery** and restoring stable high-speed locomotion via sim-to-real transfer.

**CATS Lab** | Madison, Wisconsin, United States

**July 2024 – August 2024**

Department of Civil & Environmental Engineering, Affiliate of Electrical & Computer Engineering

Summer Undergraduate Research

- Developed an autonomous navigation system for a Ranger omnidirectional robot using OpenCV/Python vision pipelines; integrated ROS 2 nodes for real-time sensor–motor communication, control, and data processing across indoor and outdoor environments.

**AI Group internship** | Bangkok, Thailand

**July 2023 – August 2023**

Project Assistant

- Implemented real-time C++ A\* path-planning and control algorithms for autonomous guided vehicles in industrial factory settings; integrated PLC/Ladder logic within a cross-functional team.