

Boda Huo

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Education

Carnegie Mellon University Aug 2024 – May 2026 (expected)
M.S. in Mechanical Engineering (Research) **GPA: 3.84/4.00**
Relevant Coursework: *Intro to Machine Learning; Generative AI; Computer Vision; Control Theory*

University of California, Santa Barbara Sep 2020 – Jun 2024
B.S. in Mechanical Engineering **GPA: 3.86/4.00**
Relevant Coursework: *Introduction to Robotics; Statics; Dynamics; Fluid & Thermal Sciences*

Research Experience

Visuo-Tactile Sensor

Safe AI Lab (CMU) Sep 2024 – Present

- Designed & developed a new vision-tactile sensor that captures both tactile deformation and overlaid color/text cues, providing richer information than prior baselines and improving downstream recognition.
- Demonstrated robust contact detection and feature extraction on extremely soft/low-stiffness materials (e.g., water droplets, facial cream, thin plastic film).
- Integrated the sensor with a VLM to sort resistors by color codes, achieving 82% accuracy end-to-end.

Dynamic Quadrupedal Transport with Tactile

Safe AI Lab (CMU) Sep 2024 – Present

- Designed and fabricated a 221-tixel piezoresistive tactile array; currently improving the manufacturing process (repeatability, yield) and updating the PCB for eliminating cross-talk + improving frame rates.
- Contributed to developing a tactile-aware transport policy using the distributed tactile array with a teacher-student pipeline (PPO → DAgger) and reliable PD tracking.
- Demonstrated zero-shot sim-to-real transport of unsecured objects over long distances and varied terrains.

Vine Robot for Mars Rover

Hawkes Lab (UC Santa Barbara) Mar 2022 – May 2024

- Designed compliant vine-robot anchoring mechanisms acting as rover “locks” to secure and stabilize tooling on sand-pebble-dust (Mars-regolith analog) surfaces.
- Built a 3×3×2 m granular-media testbed with regolith analogs and a Raspberry-Pi-based sensing/control + CV evaluation stack for anchoring and load-transfer experiments.
- Formulated a planar rover-vine model; implemented an LQI pose regulator with MRAC augmentation for gusts and soil/contact changes; validated on the testbed under varying friction and lateral loads.

Course Project

AudioGen: Audio-Driven Music Generation

Jan 2025 – May 2025

Machine Learning Engineer

- Built an audio→text labeler (an encoder + shallow neural-net design) guiding a pretrained **MusicGen** to produce longer clips matching input style.
- Implemented evaluation with CLAP similarity and Fréchet Audio Distance; ran batch generation + metrics on 900+ clips.
- Delivered an end-to-end pipeline: data curation, classifier training, prompt formatting, generation orchestration, and quantitative analysis.

Publications

Peer-Reviewed Publications

- Lin, C.; Song, Y. R.; **Huo, B.**; *et al.* (2025). *LocoTouch: Learning Dynamic Quadrupedal Transport with Tactile Sensing*. CONFERENCE ON ROBOT LEARNING (CoRL ’25), PMLR 305: 2779–2801.
PMLR: <https://proceedings.mlr.press/v305/lin25a.html>

Preprints & Submissions

- Huo, B.**[†]; Lin, C.[†]; *et al.* (2025). *SVTS: A Simultaneous Visuo-Tactile Sensor with Refraction-Based Contact Segmentation*. arXiv preprint (to appear). [†] Equal contribution.

Relevant Skills

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- Robotics/ML:** Control (LQR/MRAC), RL (PPO), sim-to-real, policy evaluation, Isaac Sim
 - Software:** Python, PyTorch, C/C++, ROS, Matlab