

## Education

<b>Carnegie Mellon University</b>	Aug 2024 – May 2026 (expected)
M.S. in Mechanical Engineering (Research)	<b>GPA: 3.84/4.00</b>
Relevant Coursework: <i>Intro to Machine Learning; Generative AI; Computer Vision; Control Theory</i>	
<b>University of California, Santa Barbara</b>	Sep 2020 – Jun 2024
B.S. in Mechanical Engineering	<b>GPA: 3.86/4.00</b>
Relevant Coursework: <i>Introduction to Robotics; Statics; Dynamics; Fluid &amp; Thermal Sciences</i>	

## Research Experience

### Visuo-Tactile Sensor

<i>Safe AI Lab (CMU)</i>	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

<i>Safe AI Lab (CMU)</i>	Sep 2024 – Present
• Designed and fabricated a 221-taxel 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

<i>Hawkes Lab (UC Santa Barbara)</i>	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 $3 \times 3 \times 2$ 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

<b>AudioGen: Audio-Driven Music Generation</b>	Jan 2025 – May 2025
<i>Machine Learning Engineer</i>	
• Built an audio→text labeler (an encoder + shallow neural-net design) guiding a pretrained <b>MusicGen</b> 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.**<sup>†</sup>; Lin, C.<sup>†</sup>; et al. (2025). *SVTS: A Simultaneous Visuo-Tactile Sensor with Refraction-Based Contact Segmentation*. arXiv preprint (to appear). <sup>†</sup> Equal contribution.

## Relevant Skills

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