

# Tianhao Wu

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## Education

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<b>University of Southern California</b> , Los Angeles, CA		Jan 2021 - Dec 2024
B.S. in Computer Engineering and Computer Science	Major GPA: 3.98 / 4	
B.S. in Applied and Computational Mathematics	Major GPA: 3.95 / 4	
	CGPA: 3.95 / 4	

## Research Experience

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<b>Driverless Intelligent Vehicle Lab</b> , CMU, Pittsburgh, PA		Jan 2025 - present
<ul style="list-style-type: none"><li>Exploring generalized multi-objective safe control framework for multi-agent systems</li></ul>		
<b>Deep Vision Lab</b> , CUHK, HK		Jun 2024 - Aug 2024
<ul style="list-style-type: none"><li>Developed a novel LLaVA model by introducing cross-attention layers for image-text fusion</li><li>Gained proficiency in Hugging Face Transformers library and deployed models on a cluster</li><li>Specialized in large vision-language models and efficient fine-tuning techniques</li></ul>		
<b>Research Assistant</b> , USC, Los Angeles, CA		Jul 2023 - Jan 2024
<ul style="list-style-type: none"><li>Assisted in developing vision models for animal action recognition</li><li>Employed SAM to segment 15000 images and converted the dataset into COCO format</li><li>Trained Mask R-CNN, Faster R-CNN, and HRNet models for pose estimation</li></ul>		
<b>Safe and Intelligent Autonomy Lab</b> , USC, Los Angeles, CA		Aug 2022 - May 2023
<ul style="list-style-type: none"><li>Acquired expertise in Hamilton-Jacobi Reachability for safety guarantees in autonomous systems</li><li>Implemented a 2D system using DeepReach and obtained the correct Backward Reachable Tubes</li><li>Improved the violation rate of DeepReach on a 9D system by 5.1% and completed a paper</li></ul>		
<b>Intelligent and Autonomous Systems Lab</b> , UCI, Irvine, CA		Jun 2022 - Aug 2022
<ul style="list-style-type: none"><li>Developed an autonomous drone capable of detecting and avoiding static obstacles</li><li>Led the team in dataset collection, model training, sensor configuration, drone assembly, scripting, flight simulation, and field testing</li></ul>		

## Preprints

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Enhancing the Performance of DeepReach on High-Dimensional Systems through Optimizing Activation Functions  
Qian Wang\*, **Tianhao Wu\***. arXiv, 2023. [\[pdf\]](#) (\* indicates equal contributions)

## Honors/Awards

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<b>MHI Undergraduate Scholar</b> , ECE Dept. ( <b>Top 5</b> selected for research excellence and potential)	2024
Engineering Honors Program	2023
Academic Achievement Award	2023
CURVE Fellowship	2022
Lenore B. Kreiger Endowed Scholarship for Math	2022
Viterbi/Dornsife Dean's List	2021 - 2024

## Teaching/Service Experience

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### Teaching Assistant, USC, Los Angeles, CA

- Contributed to over 300 discussions on Piazza and mentored over 100 students in lab sessions
- CSCI 102: Fundamentals of Computation (**Lead Undergraduate TA**) Jan 2022 - May 2024
  - Assisted the professor with grading, coordinating logistics, and proctoring exams
  - Led weekly office hours and labs to help students with programming assignments
- EE 109: Introduction to Embedded Systems Aug 2023 – Dec 2023
  - Supported students with embedded system projects during office hours and labs
- CSCI 360: Introduction to Artificial Intelligence Jan 2023 – May 2023
  - Guided students in understanding AI algorithms and solving homework

### Co-organizer for MHI Undergraduate Research Hub, USC, Los Angeles, CA

Aug 2023 - May 2024

- Hosted biweekly events aimed at strengthening ECE's undergraduate research community
- Organized research talks and panels on career pathways in academic research

### Teaching Assistant at CS@SC Summer Camp, remote

Jun 2022 - Aug 2022

- Instructed six classes of K-12 students in Python and Scratch (Jr.), totaling 120 hours of teaching
- Provided feedback on assignments and communicated students' progress to parents

### Volunteer for Mastery Learning Hour, remote

Jan 2022 - May 2022

- Tutored grade school students in math concepts and problem-solving for 4 hours per week

## Projects

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- Implemented music genre classification with machine learning algorithms [\[report\]](#)
- Built a first-person view drone from scratch [\[demo video\]](#)
- Built a hexapod robot controlled by Raspberry Pi [\[demo video\]](#)
- Developed a fall detection device [\[demo video\]](#) [\[report\]](#)
- Developed an ultrasonic rangefinder with Arduino Uno [\[demo video\]](#)

## Skills

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**Tools:** Python, C/C++, MATLAB, Verilog HDL, LaTeX, Git, Linux

**Research:** Safe Control, Robotics, Formal Methods, Machine Learning, Large Multimodal Models

**Languages:** English (Bilingual), Mandarin Chinese (Native), Spanish (Elementary)