

Haoming Wang

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Research Interests

Generative AI on Mobile Systems, Mobile Computing, Spatial Intelligence

Education

Ph.D. in Electrical and Computer Engineering, University of Pittsburgh Sept 2022 – May 2027
(Anticipated)

Advisor: Prof. Wei Gao

B.Eng. in Automation, Zhejiang University Sept 2018 – May 2022
with Honors from Chu Kochen Honors College
GPA: 3.8/4

Experience

Graduate Student Researcher, Intelligent System Lab, University of Pittsburgh Sept 2022 – Present

- **(2025 May – Now)** Enhanced VLM spatial reasoning by generating customizable 3D test scenes via LLM-based optimization and enabling on-device cross-frame reasoning. (CVPR'26 Oral, plus two papers under review)
- **(2024 Nov – 2025 May)** Developed methods for efficient and explainable on-device AI, including expediting LLM personalization via model selection and enhancing explainability.
- **(2022 Sept – 2024 Oct)** Designed novel Federated Learning frameworks to address intertwined data heterogeneity and device staleness using gradient inversion.

Teaching Assistant, Department of Electrical and Computer Engineering, University of Pittsburgh Sept 2024 – Now

- ECE 1175 – Embedded System Design (Fall 2024)
- ECE 1195 – Advanced Digital Design (Spring 2025)
- ECE 1396 – Introduction to Machine Learning (Fall 2025)
- ECE 2570 – Robotic Control (Spring 2026)

Research Assistant, Department of Control Science and Technology, Zhejiang University Sept 2020 – Jun 2022

- Signal design and processing for near-ultrasonic acoustic sensing systems on smartphones.

Selected Publications (First Author)

[CVPR'26 Oral] InfiniBench: Infinite Benchmarking for Visual Spatial Reasoning with Customizable Scene Complexity 2026

Haoming Wang, Qiyao Xue, Wei Gao

in Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition, 2026. (Acceptance Ratio: 25.4%)
[arXiv]

[MobiSys'25] Never Start from Scratch: Expediting On-Device LLM Personalization via Explainable Model Selection 2025

Haoming Wang, Boyuan Yang, Xiangyu Yin, Wei Gao

In Proceedings of the 23rd Annual International Conference on Mobile Systems, Applications and Services. (Acceptance Ratio: 18.0%)
[Paper]

[MobiCom'25] When Device Delays Meet Data Heterogeneity in Federated AIoT Applications 2025

Haoming Wang, Wei Gao

in Proceedings of the 31st ACM International Conference on Mobile Computing and Networking. (Acceptance Ratio: 17.1%)
[Paper]

[AAAI'25] Tackling Intertwined Data and Device Heterogeneities in Federated Learning with Unlimited Staleness 2025

Haoming Wang, Wei Gao

in Proceedings of the 39th Annual Conference on Artificial Intelligence, 2025. (Acceptance Ratio: 23.4%)
[Paper] / [arXiv]

Awards & Honors

ECE Research Assistant of the Year, University of Pittsburgh April 2026
Awarded by the Department of Electrical and Computer Engineering, recognized at the EGSO event.

Preprints & Papers Under Review

Uncovering and Shaping the Latent Representation of 3D Scene Topology in Vision-Language Models 2026

Haoming Wang, Wei Gao

[Paper] / [Code] (*Preprint*)

MosaicThinker: On-Device Visual Spatial Reasoning for Embodied AI via Iterative Construction of Space Representation 2026

Haoming Wang, Qiyao Xue, Weichen Liu, Wei Gao

[arXiv:2602.07082] (*Under Review*)

Deciphering Personalization: Towards Fine-Grained Explainability in Natural Language for Personalized Image Generation Models 2025

Haoming Wang, Wei Gao

[Paper] (*Under Review*)

FreezeAsGuard: Mitigating Illegal Adaptation of Diffusion Models via Selective Tensor Freezing 2024

Kai Huang, *Haoming Wang (co-author)*, Wei Gao

[Paper]

HEVEN: Small Object Search and Navigation on VLM-Based Autonomous Mobile Systems 2026

Anonymous Authors (incl. *Haoming Wang*, 3rd author)

(*Double-Blind Under Review*)

GlobalNav: Daily Object Navigation in VLM-based Autonomous Mobile Systems with Aligned Local and Global Views 2026

Anonymous Authors (incl. *Haoming Wang*, 3rd author)

(*Double-Blind Under Review*)

Reasoning Path and Latent State Analysis for Multi-view Visual Spatial Reasoning: A Cognitive Science Perspective 2026

Qiyao Xue, Weichen Liu, Shiqi Wang, *Haoming Wang*, Yuyang Wu, Wei Gao

[arXiv:2512.02340] (*Under Review*)

Spatial Reasoning in Multimodal Large Language Models: A Survey of Tasks, Benchmarks and Methods 2024

Weichen Liu, Qiyao Xue, *Haoming Wang*, Xiangyu Yin, Boyuan Yang, Wei Gao

(Under Review)