

# Yijia Wang

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## EDUCATION

### Southern University of Science and Technology (SUSTech)

Undergraduate, GPA: 3.90/4.00, rank: 2/22

- Bachelor of Engineering in *Communication Engineering* (expected)
- Member of the Innovation Experimental Class (**top 10%**)

Shenzhen, China

Sep. 2022 - present

### Stanford University

Exchange Student, GPA: 4.00

- Course: CS161 Design and Analysis of Algorithms (A), EE364A Convex Optimization I (A)

California, US

Jun. 2024 - Aug. 2024

## PUBLICATIONS

- [1] Weiming Chen\*, **Yijia Wang\***, Zhihan Zhu, Zhihai He. Generative Semantic Coding for Ultra-Low Bitrate Visual Communications and Interactions. Under review at AAAI 2026. <https://arxiv.org/abs/2510.27324>.
- [2] Weiming Chen, Zhihan Zhu, **Yijia Wang**, Zhihai He. Runge-Kutta Approximation and Decoupled Attention for Rectified Flow Inversion and Semantic Editing. Under review at ICLR 2026. <https://arxiv.org/abs/2509.12888>.
- [3] **Yijia Wang**, Yiqing Shen, Weiming Chen, Zhihai He. Understanding User Intention with LLM Reasoning for Complex Image Editing Tasks. <https://arxiv.org/abs/2510.27335>.

## PATENTS

- [1] Zhihai He, Weiming Chen, **Yijia Wang**, Zhihan Zhu, Template-Replacement Image Compression & Reconstruction Method, System and Storage Medium. App. No.: CN 202511281423.X, *accepted by CNIPA*
- [2] Zhihai He, Weiming Chen, Zhihan Zhu, **Yijia Wang**, Jian Ouyang, Image Editing Method Based on Attention Decoupling, Device, Terminal and Storage Medium. App. No.: CN 202511281645.1. *accepted by CNIPA*

## RESEARCH EXPERIENCE

### Artificial Intelligence Lab at SUSTech

Jun. 2024-Present

Research Assistant & Core Member, Advisor: Professor Zhihai He, IEEE Fellow

#### Generative Semantic Coding for Ultra-Low Bitrate Visual Communications and Interactions Mar. - May 2025

- Proposed the Generative Semantic Coding (GSC) framework, combining text descriptions and coding latents to reconstruct visual scenes using only 10% of the bitrate in traditional methods, while not sacrificing the accuracy of vision analysis.
- Introduced a joint text-latent guided image generation method that combines text prompts and selected channels of latents to guide the image generation process, ensuring both semantic and structural details in reconstructed images.

#### Runge-Kutta Approximation and Decoupled Attention for Rectified Flow Inversion and Semantic Editing

Mar. 2025 - May 2025

- Incorporated the Runge-Kutta method into the RF sampling process for the differential trajectory, and proposed a high-fidelity inversion method that better aligns the inversion and denoising paths in the sparse latent space.
- Introduced a decoupled attention mechanism that decouples the entangled text and image attention in MM-DiT<sub>s</sub>, enabling precise semantic editing in MM-DiT architectures.

#### Understanding User Intention with LLM Reasoning for Complex Image Editing Tasks Dec. 2024 - Mar. 2025

- Proposed using foundation models to decouple images to get semantic structural representations, enabling visual reasoning and editing without joint fine-tuning of LLMs and DMs.
- Designed a chain of semantic structural representation update methods, enabling multi-step reasoning through progressive refinement of the semantic structural representations and addressing complex implicit queries that require world knowledge and inference.

**Human-Machine Knowledge Expression and Interactive Learning System**, funded by the “Climbing Plan” Program  
Team Leader Oct. 2023 - Sep. 2024

- Developed a neural network-based intelligent image data labeling system, achieving three-level annotation, including image level, instance level, and pixel-level.
- Introduced deep learning models (ExpansionNet v2 and EdgeSAM) and natural language processing tools (SpaCy) to enhance annotation efficiency.

**Posture Detection for Elderly People in Indoor Scene** Feb. 2024 - Jun. 2024

- Developed a deep learning-based system for real-time posture detection of elderly individuals in indoor scenes, using YOLO X for object detection, RTMPose for keypoint estimation, and EdgeNeXt for behavior classification.

**Other Selected Research Projects**

**SkyNet Eagle Vision: Cellular Network-based Passive Radar Monitoring Technology for Drones**

**Second Prize** (No. 1 over 164 teams) in China International College Students’ Innovation Competition 2025, SUSTech

Member, Advisor: Prof. Rui Wang

Oct. 2024 - Jun. 2025

- Pioneered the integration of sensing and communication by utilizing cellular base stations for passive drone monitoring, reducing costs and energy consumption while enhancing stealth and accuracy.
- Advanced drone trajectory tracking by employing Doppler frequency shift detection and specialized algorithms, achieving high-precision monitoring that overcomes limitations of traditional radar systems.

**End-to-End Glob EDA Industry Chain**, funded by the “Climbing Plan” Program

Member, Advisor: Prof. Junmin Jiang

Oct. 2024 - Jan. 2025

- Integrates Graph Neural Networks (GNN) and Reinforcement Learning (RL) into the front-end and back-end processes of analog integrated circuit design, significantly improving design efficiency and performance while reducing reliance on manual experience.
- Achieved intelligent design from circuit topology generation, size optimization, to automatic layout and routing of the layout.

**SELECTED COURSE PROJECTS**

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**The Third Eye for Blind People** Nov. 2024 - Jan. 2025

- Developed an assistive device using Raspberry Pi, ultrasonic sensors, vibration feedback, and AI-based voice guidance.

**Seam-Carving** May 2024 - Jun. 2024

- Developed a content-aware image resizing system using Java, featuring a user-friendly GUI.

**“Jungle Chess Game” Project** May 2023 - Jun. 2023

- Developed a rule-complete game using Java with GUI, multiplayer support, AI opponent, and save/load functionality.

**Bluetooth Balanced Intelligent Car** Oct. 2023 - Dec. 2023

- Developed a two-wheeled obstacle-avoiding smart car with Bluetooth control and autonomous navigation features.

**SCHOLARSHIP AND AWARDS**

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BYD scholarship (**Top 0.5%**) Nov. 2025

2024-2025 Guo Xie Birong Scholarship (**Top 0.7%**) Sep. 2025

2024-2025 First-Class Scholarship for Outstanding Students, SUSTech (**Top 2%**) Sep. 2025

Silver Award in the China International University Students Innovation and Entrepreneurship Competition, Guangdong (**Top 0.01%**) Aug. 2025

2023-2024 Second-Class Scholarship for Outstanding Students, SUSTech (**Top 5%**) Sep. 2024

2<sup>nd</sup> Prize in the 2023 China Undergraduate Mathematical Contest in Modeling, Guangdong (**Top 15%**) Jan. 2024

2022-2023 Star of Practice Scholarship, SUSTech (**Top 1%**) Sep. 2023

2022-2023 First-Class Scholarship for Outstanding Students, SUSTech (**Top 2%**) Sep. 2023

**ADDITIONAL INFORMATION**

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**Leadership Experience:** Served for two years in the ZhiRen College Student Union and SUSTech Student Association, organizing five university-level events with over 3,000 participants.

**Volunteer Experience:** Engaged in 64 volunteer service activities in three years, with a total of 184 volunteer hours.

**Sports:** Participated in numerous sports competitions and achieved notable awards, including in events such as the Ergometer Rowing Competition and Campus Running Points Competition.

**Hobbies & Interests:** Piano (Level-10), Hulusi (Level-8)