

Haosen Zhang

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Education

Imperial College London, UK Sep 2024 – Sep 2025

- **Degree:** Master by Research in Bioengineering (MRes)
- **Supervisor:** Dr. Guang Yang
- **Research interests:** Computer Vision, Medical Image Analysis, MRI Reconstruction, Foundation Model.

Massey University, New Zealand Mar 2021 – Jul 2024

- **Degree:** Bachelor of Information Sciences in Computer Science (Bsc)
- **GPA:** 6.93/9
- **Core Courses:** Artificial Intelligence, Algorithms and Data Structures, Advanced Games Programming, Technical Programming, Web Development, Object-Oriented Programming, Software Engineering Design and Construction.

Hebei University of Technology (Project 211), China Sep 2020 – Jul 2024

- **Degree:** Bachelor of Engineering in Internet of Things (BEng)
- **GPA:** 90.04/100
- **Core Courses:** C Language Programming, Differentiation and Integration, Linear Algebra, Probability (math.), Computer Composition Principle, Fundamentals of digital electronics, Discrete Mathematics, Computer Network, Computer Operating System, Functions of a Complex variable and Integral transforms.

Publications

[1] **Haosen Zhang**, Jiahao Huang, Yinzhe Wu, Congren Dai, Fanwen Wang, Zhenxuan Zhang, and and Guang Yang; Lightweight Hypercomplex MRI Reconstruction: A Generalized Kronecker-Parameterized Approach (**Accepted by MICCAI MLMI 2025**)

- Proposed a lightweight MRI reconstruction framework using Kronecker-Parameterized Hypercomplex Networks, including Kronecker MLP, Window Attention, and Convolution modules. Designed Kronecker U-Net and SwinMR models that reduce parameters by $\sim 50\%$ while maintaining high-quality reconstructions, demonstrating strong generalization under limited data and high acceleration

[2] Fanwen Wang, Zi Wang, ... , **Haosen Zhang** et al.; Towards Universal Learning-based Model for Cardiac Image Reconstruction: Summary of the CMRxRecon2024 Challenge (**Submitted to Nature Machine Intelligence**)

[3] Jiahao Huang, Fanwen Wang, Pedro F. Ferreira, **Haosen Zhang** et al.; RSFR: A Coarse-to-Fine Reconstruction Framework for Diffusion Tensor Cardiac MRI with Semantic-Aware Refinement (**Submitted to Medical Image Analysis**)

[4] Zhenxuan Zhang, Lipai Zhang, Yanqi Cheng, Zi Wang, Fanwen Wang, **Haosen Zhang** et al.; From Coarse to Continuous: Progressive Refinement Implicit Neural Representation for Motion-Robust Anisotropic MRI Reconstruction (**Submitted to Transactions on Image Processing**)

Project

CLIP-Based Foundation Model for Cross-Modality Medical Image Reconstruction Feb 2025 – Present

- Developing a CLIP-driven generative framework for reconstructing medical images (MRI, CT, ultrasound) from diverse degraded inputs across modalities.
- Classifies image modality and degradation type via CLIP encoder; combines text embedding with degradation features as conditions for diffusion model reconstruction.
- Constructed a paired dataset of 22 simulated undersampling masks applied to MRI with corresponding clean captions to supervise learning.
- Aims to enable modality-aware, degradation-aware reconstruction using large-scale vision-language pretraining.

Lightweight Hypercomplex MRI Reconstruction (MICCAI MLMI) Mar 2025 – May 2025

- Proposed a novel MRI reconstruction framework using Kronecker-Parameterized Hypercomplex Neural Networks to

reduce model size by up to 50% while maintaining reconstruction quality.

- Introduced Kronecker MLP, Kronecker Window Attention, and Kronecker Convolution to enhance parameter efficiency in both Transformer- and CNN-based architectures.
- Designed Kronecker U-Net and Kronecker SwinMR, achieving competitive PSNR, SSIM, and LPIPS even at high acceleration factors ($8\times$, $16\times$).
- Demonstrated superior generalization and reduced overfitting on small datasets, enabling real-time MRI deployment on hardware-constrained systems.

Guardian Spirit Robot, Elderly Care & Disinfection Robot (YoloV5)

May 2022 – Dec 2022

- Designed a multifunctional robot combining UV disinfection and elderly interaction.
- Integrated YoloV5 for object recognition and navigation with IR + gyro sensors.
- Enabled SLAM mapping and 222nm UV-based air-safe disinfection; supported dialect voice input.

Intelligent Garbage Bin, IoT Design Project

Jun 2023 – Jul 2024

- Designed a Raspberry Pi-based smart bin with garbage classification using TensorFlow.
- Built and trained custom dataset; converted model to TFLite for edge deployment.
- Integrated servo-controlled lid, interactive UI with Tkinter, and full testing suite.

Experience

Beijing Yunxingyu Transportation Technology, System Management Intern

April 2023 – Aug 2023

- Maintained ETC transaction data using MySQL and backend logic in Java.
- Used RabbitMQ to sync ETC with gas stations; developed REST APIs and MuleSoft integration.
- Standardized data communication using JSON; ensured real-time system interoperability.

Zhejiang Uniview Technology, Computer Vision Intern

Jun 2022 – Sep 2022

- Developed CV algorithms for automatic traffic incident detection and management.
- Led end-to-end workflow: data collection, preprocessing, model testing, and deployment.
- Contributed to real-time monitoring and emergency response via integrated vision pipeline.

Competitions & Awards

National Mathematical Modeling Competition, CSIAM

2023

- Led regression and k-means modeling; awarded First Prize (Provincial Level).

MCM/ICM (US Math Modeling), COMAP

2023

- Built ARIMA-based time series model; earned Honorable Mention.

CCF National Algorithm Competition, China Computer Federation

2022

- Led algorithmic problem solving and won Bronze Medal.

Technologies

Programming Languages: C++, Python, C, Java, C#

Technologies: Matlab, Pytorch, Pycharm, Remote Development on Linux, .NET

Language Skills

Language Skills

- Chinese: Native proficiency
- English: IELTS 6.5