

Curriculum Vitae

Name: Yichao Cai

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[Homepage] [Google Scholar] [Research Profile] [GitHub] [LinkedIn] [Blog]

Research Interests

- Multimodal representation learning; robustness and generalization
- Identifiable, interpretable representations; latent causal discovery; alignment
- Contrastive learning; generative modeling; language-guided supervision

Education

Ph.D. in Computer Science, Adelaide, Australia

Sep 2023–Present

School of Computer and Mathematical Sciences, The University of Adelaide

Advisor: Prof. Javen Qinfeng Shi

Research Focus: Robust, interpretable multimodal representation learning integrating vision and language.

M.Sc. in Instrument Science and Technology, Wuhan, China

Sep 2016–Jun 2019

School of Mechatronics Engineering, Wuhan University of Technology

Advisor: Prof. Xiao Zhou

Thesis: Pedestrian head-pose estimation from traffic video for public-safety analytics.

B.Eng. in Measurement, Control Technology and Instruments, Wuhan, China

Sep 2012–Jun 2016

School of Mechatronics Engineering, Wuhan University of Technology

Project: Rail-weld inspection system for automated quality and alignment assessment.

Publications

(* indicates equal contribution)

[1] Liu, Y.; Gong, D.; Cai, Y.; Gao, E.; Zhang, Z.; Huang, B.; Gong, M.; van den Hengel, A.; Shi, J. Q. (2025). I Predict Therefore I Am: Is Next Token Prediction Enough to Learn Human-Interpretable Concepts from Data? arXiv. <https://arxiv.org/abs/2503.08980>.

[2] Cai, Y.*; Liu, Y.*; Gao, E.; Jiang, T.; Zhang, Z.; van den Hengel, A.; Shi, J. Q. (2025). On the Value of Cross-Modal Misalignment in Multimodal Representation Learning. *Advances in Neural Information Processing Systems (NeurIPS 2025)*. (Spotlight, top 3.2%)

[3] Cai, Y.; Liu, Y.; Zhang, Z.; Shi, J. Q. (2024). CLAP: Isolating Content from Style Through Contrastive Learning with Augmented Prompts. *European Conference on Computer Vision (ECCV 2024)*, pp. 130–147. https://doi.org/10.1007/978-3-031-72664-4_8

[4] Cai, Y.; Li, D.; Zhou, X.; Mou, X. (2018). Robust Drivable Road Region Detection for Fixed-Route Autonomous Vehicles Using Map-Fusion Images. *Sensors* 18(12):4158. <https://doi.org/10.3390/s18124158>

Professional Experience

Postgraduate Researcher, Australian Institute for Machine Learning, Adelaide, Australia

Sep 2023–Present

- Develop theory and methods for identifiable, robust multimodal (vision–language) representations.
- Lead experiments and maintain open-source codebases; ensure reproducibility and rigorous evaluation.

Pre-doctoral Research Preparation, Nanchang, China

Sep 2022–Sep 2023

- Conducted self-directed study in probability, optimization, causal inference, and deep learning while awaiting approval of the Australian Subclass 500 visa to commence PhD studies.

Algorithm Engineer, Tellhow Software, Nanchang, China

Jun 2020–Aug 2022

- Designed and built inspection systems for power-industry equipment; developed automated safety analytics to improve construction workflows.

Software Engineer, Huawei Technologies, Dongguan, China

Jul 2019–Apr 2020

- Implemented communication service platforms and developed video ringback tone systems.

Teaching

Head Tutor, Statistical Machine Learning, The University of Adelaide *Sem. 2 2025*
Course Coordinator: Dr. Zhen Zhang

- Organized tutor schedules; chaired weekly teaching-team meetings.
- Assessed assignments; provided student support via Q&A.

Teaching Assistant, Using Machine Learning Tools, The University of Adelaide *Trim. 2 2025*
Course Coordinator: Dr. Yiliao Song

- Developed autograding scripts and rubrics; graded assignments; handled student queries.

Teaching Assistant, Concepts in AI and ML, The University of Adelaide *Trim. 1 2025*
Course Coordinator: Dr. Yiliao Song

- Marked assignments and handled student queries.

Academic Service

Reviewer: IEEE International Conference on Industrial Informatics (INDIN) 2024

Honors and Awards

Award for Outstanding Graduates, Wuhan University of Technology *Jun 2019*
Merit Graduate Student Award, Wuhan University of Technology *Nov 2017*

Technical Skills

ML/AI: PyTorch; deep learning; statistical machine learning; computer vision
Programming/Tools: Python (NumPy, HuggingFace), C/C++; Git; Linux; \LaTeX
Research: Experimental design/evaluation; reproducibility; latent-variable modeling

Scholarly Activities

Poster, European Conference on Computer Vision (ECCV), Milan, Italy *Sep 29–Oct 4, 2024*
Presented “CLAP: Isolating Content from Style Through Contrastive Learning with Augmented Prompts.”

Visiting Student Researcher, California PATH, UC Berkeley, USA *May 1–Sep 30, 2018*
Short-term research (non-degree) in computer vision under Prof. Xiao Zhou and Dr. Ching-Yao Chan.

References

Available upon request.