

Jiachen Jiang

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EDUCATION

The Ohio State University

Columbus, USA

Degree: Ph.D in Computer Science Engineering; GPA: 4.00/4.00

Aug 2023 – May 2028

- **Area:** Artificial Intelligence; Network Security; Graphics
- **Research Focus:** Advised by Prof. Zhihui Zhu on representational learning, low-dimensional models, LLMs, multimodal LLMs, and in-context learning.

University of Michigan

Ann Arbor, USA

Degree: Master in Electrical and Computer Engineering; GPA: 3.990/4.00

Sep 2020 – Apr 2022

- **Area:** Signal Processing and Machine Learning;
- **Coursework:** Probability and Random Process; Computer Vision; Matrix Method for Signal Processing; Machine Learning; Image Processing; Optimization Method; Natural Language Processing; Computer Architecture

Beihang University

Beijing, China

Degree: Bachelor in Electrical Engineering; GPA: 3.793/4.00

Sep 2016 – Jun 2020

- **Honors:** Second Prize in National Undergraduate Electronics Design Contest, 08/2019; First Prize in Beijing Integrated Circuit Design Competition, 06/2019; Group Silver Award of Youth Entrepreneurship Competition, 06/2018; Second Prize of Mathematical Modeling Competition, 05/2018; Third Prize of Fengru Cup Creative Thesis Competition, 09/2017

INTERNSHIP

Microsoft Research, Applied Sciences Group

Redmond, USA

Summer Research Intern

Jun 2024 – Sep 2024

- Worked with Tianyu Ding on project about efficient all-in-one image restoration, including image denoising, dehazing, deraining, deblurring and light-enhancement.
- Implement a content-aware and task-aware all-in-one image restoration method that adaptively processes detailed areas using attention and plain areas using convolution.

Institute of Automation, Chinese Academy of Sciences

Beijing, China

Undergraduate Research Assistant

Jul 2019 – Sep 2019

- Main research direction: Human Concentration level detection based on EEG signal; In charge of most of the programming tasks, including model building, model refinement, algorithm implementation, and debugging.
- Wrote the summary part in the patent writing and described the technical route of the algorithm.

PUBLICATIONS

- [1] Jiachen Jiang, Tianyu Ding, Zhihui Zhu. “DeltaEvolve: Accelerating Scientific Discovery through Momentum-Driven Evolution.” *International Conference on Machine Learning (ICML)*, 2026.
- [2] Jinxin Zhou, Jiachen Jiang, Zhihui Zhu. “Improving Visual Discriminability of CLIP for Training-Free Open-Vocabulary Semantic Segmentation.” *Transactions on Machine Learning Research (TMLR)*, 2026.
- [3] Yuxin Dong, Jiachen Jiang, Zhihui Zhu, Xia Ning. “Understanding Task Vectors in In-Context Learning: Emergence, Functionality, and Limitations.” *International Conference on Learning Representations (ICLR)*, 2026.
- [4] Zhen Qin, Jiachen Jiang, Zhihui Zhu. “Learning to Adapt: In-Context Learning Beyond Stationarity.” *International Conference on Learning Representations (ICLR)*, 2026.
- [5] Jiachen Jiang, Yuxin Dong, Jinxin Zhou, Zhihui Zhu. “From Compression to Expansion: A Layerwise Analysis of In-Context Learning.” *ICLR Workshop on Deep Generative Model in Machine Learning: Theory, Principle and Efficacy (Delta)*, 2026.

- [6] Zhen Qin, Jinxin Zhou, Jiachen Jiang, Zhihui Zhu. “On the Convergence of Gradient Descent on Learning Transformers with Residual Connections.” *IEEE Signal Processing Letters (SPL)*, 2026.
- [7] Ke Zhang, Tianyu Ding, Jiachen Jiang, Tianyi Chen, Ilya Zharkov, Vishal M. Patel, Luming Liang. “ProCrop: Learning Aesthetic Image Cropping from Professional Compositions.” *AAAI Conference on Artificial Intelligence (AAAI)*, 2026.
- [8] Jiachen Jiang, Jinxin Zhou, Bo Peng, Xia Ning, Zhihui Zhu. “Analyzing Fine-Grained Alignment and Enhancing Vision Understanding in Multimodal Language Models.” *Conference on Neural Information Processing Systems (NeurIPS)*, 2025.
- [9] Alina Liu, Christopher Hill, Jiachen Jiang, Zhihui Zhu. “Can Reasoning LLMs Eliminate Conformity in Multi-Agent Systems?” *IEEE ICDM 2025: Undergraduate and High School Symposium (UGHS Symposium)*. **(Best Paper Award)**
- [10] Jiachen Jiang, Jinxin Zhou, Zhihui Zhu. “Tracing Representation Progression: Analyzing and Enhancing Layer-Wise Similarity.” *International Conference on Learning Representations (ICLR)*, 2025.
- [11] Jinxin Zhou, Jiachen Jiang, Zhihui Zhu. “Are All Layers Created Equal: A Neural Collapse Perspective.” *Conference on Parsimony and Learning (CPAL)*, 2025.
- [12] Jiachen Jiang, Jinxin Zhou, Peng Wang, Qing Qu, Dustin Mixon, Chong You, Zhihui Zhu. “Generalized Neural Collapse for a Large Number of Classes.” *International Conference on Machine Learning (ICML)*, 2024.
- [13] Jinxin Zhou, Tianyu Ding, Tianyi Chen, Jiachen Jiang, Ilya Zharkov, Zhihui Zhu, Luming Liang. “DREAM: Diffusion Rectification and Estimation-Adaptive Models.” *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2024.

PREPRINTS

- [1] Jiachen Jiang, Huminhao Zhu, Zhihui Zhu. “SMCEvolve: Principled Scientific Discovery via Sequential Monte Carlo Evolution.” *arXiv preprint*, 2026.
- [2] Jiachen Jiang, Zhen Qin, Zhihui Zhu. “In-Context Learning for Non-Stationary MIMO Equalization.” *arXiv preprint*, 2025.
- [3] Xudong Zhu, Jiachen Jiang, Mohammad Mahdi Khalili, Zhihui Zhu. “From Emergence to Control: Probing and Modulating Self-Reflection in Language Models.” *arXiv preprint*, 2025.
- [4] Jiachen Jiang, Tianyu Ding, Ke Zhang, Jinxin Zhou, Tianyi Chen, Ilya Zharkov, Zhihui Zhu, Luming Liang. “Cat-AIR: Content and Task-Aware All-in-One Image Restoration.” *arXiv preprint*, 2025.
- [5] Tianyu Ding, Tianyi Chen, Haidong Zhu, Jiachen Jiang, Yiqi Zhong, Jinxin Zhou, Guangzhi Wang, Zhihui Zhu, Ilya Zharkov, Luming Liang. “The Efficiency Spectrum of Large Language Models: An Algorithmic Survey.” *arXiv preprint*, 2023.

PROJECTS

Hyperspectral Images Denoising via a Tensor Dictionary | [GitHub](#)

- This project focuses on denoising hyperspectral images (HSIs) using MATLAB. HSIs, as 3rd order tensors, provide richer scene representations than RGB or grayscale images, improving computer vision task performance. Our approach uses a Tensor Dictionary Model that leverages nonlocal spatial similarity and global spectral correlation. We enhance patch clustering and optimization by introducing a sparse global dictionary representation, solving the resulting nonconvex Lagrange dual problem through iterative optimization.

Monitoring Social Distancing and Mask Wearing with Person Detection and Tracking | [GitHub](#)

- A real-time COVID-19 safety monitoring system using computer vision and deep learning. The system tracks social distancing and mask wearing through video feeds. Key components include human detection, face detection, mask classification, and 6-feet social distance visualization using computer vision techniques like Mask-RCNN, homography transformation, and binary classification.

A City Search Engine Website Design Based on Flask | [GitHub](#)

- A website using HTML and Python that displays the top 5 most populous cities for any selected country. Users can sort cities by population or distance from Ann Arbor, viewing data like WikiData ID, coordinates, population, and distance. Real-time tweets about each city are also displayed.

Racing on a Pre-Defined Map with Unknown Obstacles with PID Controller | [GitHub](#)

- MATLAB project for bicycle control optimization. Two main tasks: 1) Design a controller to navigate a pre-defined track quickly, and 2) Develop an algorithm to avoid runtime obstacles. Focused on task 2, implementing modules for obstacle avoidance, reference trajectory generation, and PID control.

Dual Multi-head Co-Attention For Abstract Meaning Reading Comprehension | [GitHub](#)

- A Natural Language Processing project for SemEval-2021 Task 4, a cloze-style task where systems select abstract concepts from five candidates to fill question placeholders. Using ELECTRA as our encoder with DUal Multi-head Co-Attention (DUMA) classifier, we achieved competitive results: 3rd place in task 1 and 5th place in task 2, with accuracies of 89.95% and 91.41% respectively.

A 3-way Superscalar Out-of-Order CPU with P6 style Register Renaming | [GitHub](#)

- A 6-stage CPU design project in Verilog implementing P6-style register renaming. The pipeline includes: Fetch (3 instructions in-order), Dispatch (decode and register read), Issue (zero-dependency instructions from RS), Execute (3 ALUs, 3 multipliers), Complete (LSQ for memory operations), and Retire (ROB head to register file).

SKILLS

Programming: C, C++, Java, Python, MATLAB, MySQL, Html, Verilog

Technologies: Pytorch, Git, Linux, STM-32, Solidworks, Xilinx ISE

Languages: Chinese(Native), English (TOFEL:101, GRE: 320+3.5)