Yichao Zhou

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Education

Peking University (PKU) | *Bachelor* | *School of EECS* 09/2021 – 07/2026

- PKU Zhi Class (Honors Program in Artificial Intelligence) of 2022.
- GPA: 3.918/4; GPA for Major Courses: 3.918/4; Rank: 1/60.
- Major coursework consistently achieved A+/A performance (scores $\geq$ 90/100).
- Relevant courses: machine learning, introduction to multi-agent systems, cognitive science, multimodal learning, foundations of natural language processing, computer vision, rationality and intelligence, introduction to visual computing and interaction, information theory, data structure and algorithms, algorithm design and analysis, numerical methods, the mathematics in AI (probability and statistics), and programming in C/C++.

Research Interests

Computational Cognition & Reasoning

- Computational social cognition, Theory of Mind (ToM), and computational neuroscience.

Research Experience

CoRe Lab, Institute for AI / School of Psychological and Cognitive Sciences, PKU
Research Assistant 05/2023 – Present
Advisor: Prof. Yixin Zhu

- Research on human communication modeling and emergent graphical symbol systems.
- Research on primate neural processing of symbolic visual and auditory stimuli.

SCAI Lab, Department of Computer Science, JHU 07/2024 – 08/2025
Research Assistant *Advisor: Prof. Tianmin Shu*

- Research on Theory of Mind reasoning and multi-agent system modeling.

Research Projects

Verb Emergence in Multi-agent Visual Communication Games 10/2023 – Present

- Investigating the emergence of graphical representations for verbs in multi-agent communication.
  - Developed emergent communication frameworks and diffusion-based sketch-to-video models.
  - Observed correlations between iconic drawing sequences and symbolic verb representations.
  - Designing EEG experiments to examine neural evidence for verb representations.

Promoting Prosocial Behaviour via ToM-Informed Feedback 07/2024 – 08/2025

- Developed a coordination assistant for agents with independent goals in simulated environments.
  - Applied Bayesian inverse planning for goal and belief inference under POMDP settings.
  - Delivered context-grounded and timely natural language feedback to guide prosocial actions.
  - Improved overall task performance and user-rated helpfulness over VLMs and reasoning models.

Neural Responses to Cross-Modal Linguistic Symbols in Primates 05/2025 – Present

- Investigating macaque neurons that show selective preferences for cross-modal linguistic stimuli.
  - Prepared visual and auditory stimulus sets across various linguistic symbols and natural stimuli.
  - Analyzed Neuropixels extracellular data for neural selectivity and cross-modal preferences.
  - Providing insight into why writing systems and speech–symbol mappings take their present forms.

Meta-ToM for Generalizable Cross-Domain Agent Modeling 08/2025 – Present

- Designing a unified framework to learn user-specific patterns from past episodes for generalization.
  - Developing a Meta-ToM proposer that infers user-specific patterns as latent variables.
  - Fine-tuning LMs to propose structured hypotheses that improve cross-task generalization.
  - Eliminating the need for ground-truth mental-state supervision, enabling scalable inference.

Honors

National Scholarship 2022, 2024

- Top 1%, the highest scholarship from the Ministry of Education of China.

Leo KoGuan Scholarship 2023

- Top 1%, recognized as one of the most prestigious scholarships in Peking University.

National Undergraduate Mathematics Competition – First Prize 2022

- Top-tier national competition recognizing excellence in mathematical reasoning.

Teaching Experience

Introduction to Computation, School of EECS, PKU Fall 2023, Fall 2025

Teaching Assistant *Instructor: Prof. Wei Guo*

- Credits: 3.
- Computer and Python programming foundation course for cross-departmental freshmen.
- Facilitated understanding of core principles of computing, Python programming, image processing (cv2, PIL), numerical calculation (numpy), chart analysis (pandas, plt), basic Internet technologies (pyppeteer), and key algorithms.

Algorithm Design and Analysis, School of EECS, PKU Spring 2024

Teaching Assistant *Instructor: Prof. Xiaolin Wang*

- Credits: 5.
- Core algorithm course for sophomores majoring in computer science and artificial intelligence.
- Guided students through comprehensive algorithm design and analysis techniques, including divide and conquer, dynamic programming, greedy methods, backtracking, linear programming, network flows, complexity analysis, NP-completeness, approximation, and randomized algorithms.

Technical Skills

Programming Languages: Python (Proficient), C/C++, Javascript, LaTeX, MATLAB.

Frameworks and Tools: PyTorch (Proficient), Visual Studio Code, Pycharm.

Language Proficiency

English: TOEFL - 111/120 (Reading: 30, Listening: 28, Speaking: 25, Writing: 28).

Other Languages: Chinese (Native), Japanese (Intermediate, JLPT N2 Passed), German (Basic).