ZHU LIU

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EDUCATION

Tsinghua University, Beijing, China

Ph.D. in Computational Linguistics (School of Humanities)   Aug. 2022 – Present

Supervisors: Prof. Ying Liu (advisor), Prof. Maosong Sun (co-supervisor)

Research Topics: Evaluation and Interpretability of Language Model; Computational Lexical Semantics; Semantic Map Models

GPA: 3.93/4.00

Southern University of Science and Technology, Shenzhen, China

M.S. in Computer Science and Technology   Aug. 2019 – Jun. 2022

Supervisor: Prof. Feng Zheng

Thesis: Towards Human-like Diverse Video Captioning via a Latent Generative Model

Research Topics: Video Captioning; Conditional Text Generation; Variational-based Models

GPA: 3.67/4.00

Dalian University of Technology, Dalian, China

B.Eng. in Software Engineering   Sept. 2015 – Jun. 2019

RESEARCH EXPERIENCE

Research Intern, THUNLP, Tsinghua University   Sept. 2023 – Present

Supervisor: Prof. Maosong Sun

- Analyzed hidden representations of large language models (LLMs) to investigate how they capture word meaning and semantic relations.

- Compared semantic representations across model architectures and scales.

- Published two papers in top-tier NLP conferences, including ACL and NAACL.

Visiting Student, Sapienza NLP, Sapienza University of Rome   Mar. 2025 – Aug. 2025

Supervisor: Prof. Roberto Navigli

- Evaluated LLMs on multilingual lexical semantics from a language typology perspective.

- Generated multilingual corpora through controlled LLM-based translation and quality monitoring.

- Contributed to expanding BabelNet and advancing multilingual word sense disambiguation research.

PUBLICATIONS

Note: The CCF classification refers to the evaluation by the China Computer Federation (CCF), the authoritative academic organization in the field of computer science in China. Among them, **ACL**, **EMNLP**, and **NAACL** are internationally recognized as top-tier conferences in computational linguistics.

Model Evaluation

Zhu Liu and Ying Liu. **"Ambiguity Meets Uncertainty: Investigating Uncertainty Estimation for Word Sense Disambiguation."** *Findings of ACL 2023*, pp. 3963–3977, Toronto, Canada. (**CCF A**)

Zhu Liu, Zhen Hu, and Ying Liu. **"CoMeDi Shared Task: Models as Annotators in Lexical Semantics Disagreements."** *CoMeDi Workshop, COLING 2025*, Abu Dhabi, UAE. (**CCF B**)

Zhu Liu, Cunliang Kong, Ying Liu, and Maosong Sun. **"A Top-down Graph-based Tool for Modeling Classical Semantic Maps: A Crosslinguistic Case Study of Supplementary Adverbs."** *NAACL 2025*, Albuquerque, New Mexico. (**CCF B**)

Zhu Liu, Zhen Hu, Lei Dai, and Ying Liu. **"XISM: An Exploratory and Interactive Graph Tool to Visualize and Evaluate Semantic Map Models."** *arXiv:2507.04070*, 2025. (Under review)

Model Interpretability

Zhu Liu, Cunliang Kong, Ying Liu, and Maosong Sun. **"Fantastic Semantics and Where to Find Them: Investigating Which Layers of Generative LLMs Reflect Lexical Semantics."** *Findings of ACL 2024*, pp. 14551–14558, Bangkok, Thailand. (**CCF A**)

Kangyang Luo, Yuzhuo Bai, Cheng Gao, Shuzheng Si, Yingli Shen, **Zhu Liu**, et al. **"GLTW: Joint Improved Graph Transformer and LLM via Three-Word Language for Knowledge Graph Completion."** *Findings of ACL 2025*. (**CCF A**)

Zhu Liu, Ying Liu, Kangyang Luo, Cunliang Kong, and Maosong Sun. **"From the New World of Word Embeddings: A Comparative Study of Small-World Lexico-Semantic Networks in LLMs."** *arXiv:2502.11380*, 2025. (Under review)

Multimodal AI

Zhu Liu, Teng Wang, Jinrui Zhang, Feng Zheng, Wenhao Jiang and Ke Lu. **"Show, Tell and Rephrase: Diverse Video Captioning via Two-Stage Progressive Training."** *IEEE Transactions on Multimedia*, Vol. 25, pp. 7894–7905, 2022. (**CCF B, JCR&SCI Q1, IF: 9.7**)

Jian Ma, **Zhu Liu**, Yurong Shi, Bingxian Luo, and Feng Zheng. **"Multimodal Solar Flare Prediction Model Based on Sunspot Group Data."** *Spacecraft Environmental Engineering*, 2021, 38(3):256–262.

Teng Wang, **Zhu Liu**, Feng Zheng, Zhichao Lu, Ran Cheng, and Ping Luo. **"Semantic-Aware Pretraining for Dense Video Captioning."** *arXiv preprint arXiv:2204.07449*, 2022.

PRESENTATIONS

"A Top-down Graph-based Tool for Modeling Classical Semantic Maps: A Crosslinguistic Case Study of Supplementary Adverbs", NAACL 2025, New Mexico, USA, April. Online **poster** presentation; Sixth THU University Youth Academic Forum on Linguistics and Philology, Beijing, China, October 2024. **oral** presentation in English.

"CoMeDi Shared Task: Models as Annotators in Lexical Semantics Disagreements", COLING 2025, Abu Dhabi, UAE, April. **poster** presentation in English.

"Fantastic Semantics and Where to Find Them: Investigating Which Layers of Generative LLMs Reflect Lexical Semantics", ACL 2024, Bangkok, Thailand, August. **poster** presentation in English.

"Uncertainty Qualification for Word Sense Disambiguation", ACL 2023, Toronto, Canada, July. Online **poster** presentation; COLING 2025, Abu Dhabi, UAE, April. **poster** presentation in English; Fourth THU University Youth Academic Forum on Linguistics and Philology, Beijing, China, October 2023. **oral** presentation in Chinese.

"Transitivity Analysis of Subject-Object Reciprocal Sentences Using a Large Language Model", Fifth THU University Youth Academic Forum on Linguistics and Philology, Beijing, China, October 2023. **oral** presentation in Chinese.

TEACHING EXPERIENCE

Teaching Assistant, Tsinghua University   Mar. 2023 – Jul. 2023

Course: Python and Digital Humanities

Language: Chinese

Class size: 30 students

Responsibilities: Answering student questions, teaching case studies on digital humanities, checking and grading assignments

Teaching Assistant, Southern University of Science and Technology   Mar. 2020 – Jul. 2020

Course: C and C++ Programming

Language: English and Chinese

Class size: 120 students

Responsibilities: Designing and grading assignments, assisting students with questions

PROJECTS

Exploratory and Interactive Graph Tool for Semantic Map Models (SMMs) A web-based platform for constructing, visualizing, and evaluating semantic map models from user-provided data, supporting large-scale, human-in-the-loop analyses for linguistic typology research.

Interactive and Automatic Mural Captioning System An AI-driven system designed to generate both localized and holistic descriptions of murals, engaging audiences through generative language models. *Outstanding Creative Paper Award, CDH 2023.*

ACADEMIC SERVICE

Member and Reviewer, conferences of the Association for Computational Linguistics (ACL)

Member, Chinese Conference on Computational Linguistics (CCL)

Chair, Student Research Workshop at ACL 2025

Volunteer, COLING 2025 and NAACL 2025

RESEARCH FUNDING

Participant, *Analyses and Researches of Classic Texts of Classical Literature Based on Big Data Technology* National Major Program of Philosophy and Social Science Fund (18ZDA238)

Participant, *Research on the Long-Term Goals and Development Plan for National Language and Script Work by 2035* (ZDA145-6)

Participant, Institute Guo Qiang, Tsinghua University

Participant, Tsinghua University Initiative Scientific Research Program (2019THZWJC38)

Participant, National Science and Technology Major Project (2020AAA0106502)

Participant, *Research on Recommendation Algorithms for Spatial Environmental Events*, National Space Science Center, CAS (Sep. 2019 – Mar. 2020), 120K RMB

Participant, *Solar Flare Prediction Using Multi-modal Deep Learning Models*, GF Hi-tech Innovation Fund (Nov. 2020 – Mar. 2021), 300K RMB

SELECTED AWARDS AND HONORS

First Prize, THU University Comprehensive Excellence Scholarship (**Top 5%**) Oct. 2025

First Prize, THU University Comprehensive Excellence Scholarship (**Top 5%**) Oct. 2023

First/First/Third Prize, 6/5/4th Tsinghua University Youth Academic Forum on Linguistics and Philology (**Top 10%**)   Sept. 2022/2023/2024

SKILLS

Languages: Mandarin Chinese (native), English (IELTS 7.5)

Programming: Python, R, Matlab, C++, PyTorch

REFERENCES

Professor Ying Liu	**Professor Maosong Sun**	**Prof. Roberto Navigli**
Computational Linguistics	Department of Computer Science	Department of Computer Science
School of Humanities		
Tsinghua University	Tsinghua University	Sapienza University of Rome
Beijing, China	Beijing, China	Rome, Italy
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