Joe (Jiazhou) Liang

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Summary of Qualifications

- PhD student in Applied Machine Learning at the University of Toronto (D3M Lab), supervised by Prof. Scott Sanner, with a research focus on conversational recommendation systems, memory-augmented LLM agents, and egocentric information retrieval.
- Strong publication record at top venues including **ACL 2026** (3 papers), **ICLR 2026**, **AAAI 2026**, **EMNLP 2025**, **UMAP 2026**, and *Sociological Methods & Research*, spanning retrieval, NLP, optimization, and embodied AI.
- Recipient of the **Ontario Graduate Scholarship** and multiple University of Toronto fellowships and conference awards; MIE Teaching Assistant Award 2024–2025.
- Deep technical expertise in LLMs, knowledge graph-based memory systems, Transformer architectures, mixed-integer optimization (LP/MILP), and scalable ML pipelines (PyTorch, Python, PySpark).
- Three years of experience as Head TA for *Introduction to Data Science* (MIE223) and TA for *Decision Support System* (MIE451) and *Introduction to Machine Learning* (MIE370), mentoring 100+ students per term.

Education

University of Toronto | Doctor of Philosophy in Computer Science — Sep 2025 – Present

- *Research Topic:* Novel Methods and Memory Access for Conversational Agents and Recommendation Systems
- *Supervisor:* Prof. Scott Sanner, Data Driven & Decision Making (D3M) Lab
- *Awards:* Ontario Graduate Scholarship; University of Toronto Departmental Fellowship; School of Graduate Studies Conference Award; Departmental Conference Award

University of Toronto | Master of Applied Science in Information Engineering — Sep 2023 – Aug 2025

- *Thesis:* Novel Optimization Methods for Temporal and Predictive Clustering
- *Supervisor:* Prof. Scott Sanner
- *Awards:* MIE Fellowships; MIE Teaching Assistant Award

University of Waterloo | Bachelor of Mathematics in Computational Mathematics — Sep 2018 – Jun 2022

- *Awards:* Dean's Honor List; Graduated with Distinction

Publications

- **Liang, J.***, Liu, Y.*, Guo, D.*, Jiang, Y., Sun, M., & Sanner, S. (2026). Evaluating Scene-based In-Situ Item Labeling for Immersive Conversational Recommendation. *the 64th Annual Meeting of the Association for Computational Linguistics* **(ACL 2026)**.
- Liu, Y.*, Wen, Q.*, **Liang, J.***, Zhao, M.*, Cui, J., Korikov, A., ... & Sanner, S. (2026). Multimodal Item Scoring for Natural Language Recommendation via Gaussian Process Regression with LLM Relevance Judgments. *the 64th Annual Meeting of the Association for Computational Linguistics* **(ACL 2026)**.
- Kim, J., Korikov, A., **Liang, J.**, Cui, J., Liu, Y. S., Wen, Q., ... & Sanner, S. (2026). Bayesian Active Learning with Gaussian Processes Guided by LLM Relevance Scoring for Dense Passage Retrieval. *the 64th Annual Meeting of the Association for Computational Linguistics* **(ACL 2026)**.

  Liu, Y. S.*, Wu, R.*, Gallagher, L.*, **Liang, J.***, Toroghi, A., & Sanner, S. (2026). Semantic XPath: Structured Agentic Memory Access for Conversational AI. *the 64th Annual Meeting of the Association for Computational Linguistics* **(ACL 2026 Demo)**.
- Liu, X., Toroghi, A., **Liang, J.**, Courtis, D., ... & Sanner, S. (2026). Natural Language PDDL (NL-PDDL) for Open-world Goal-oriented Commonsense Regression Planning in Embodied AI. *Proceedings of the 14th International Conference on Learning Representations* **(ICLR 2026)**.
- **Liang, J.***, Khurram, H.*, & Sanner, S. (2026). Near-optimal Linear Predictive Clustering in Non-separable Spaces via MIP and QPBO Reductions. *Proceedings of the AAAI Conference on Artificial Intelligence*, Vol. 40 **(AAAI 2026)**.

- Guo, D., Sun, M., Jiang, Y., **Liang, J.**, & Sanner, S. (2026). VOGUE: A Multimodal Dataset for Conversational Recommendation in Fashion. *Proceedings of the 34th ACM Conference on User Modeling, Adaptation and Personalization* **(UMAP 2026)**.
- **Liang, J.**, Tosanwumi, J., Fosse, E., Silver, D., & Sanner, S. (2026). Mapping Social Change: A Unified Framework for Temporal Clustering. *Sociological Methods & Research*.
- Liu, Y., Wen, Q., Zhao, M., **Liang, J.**, & Sanner, S. (2025). MA-DPR: Manifold-aware Distance Metrics for Dense Passage Retrieval. *Proceedings of the 2025 Conference on Empirical Methods in Natural Language Processing* (pp. 31073–31091) **(EMNLP 2025)**.
- **Liang, J.***, Tosanwumi, J.*, Silver, D., Fosse, E., & Sanner, S. (2024). tscluster: A Python Package for the Optimal Temporal Clustering Framework. *Environment and Planning B: Urban Analytics and City Science*, *52*(4), 1014–1024.

*Equal contributions.

Research Experience

Graduate Research Assistant | Data Driven & Decision Making Lab, University of Toronto — Sep 2023 – Present

- Conducting research on structured memory systems, agentic information retrieval, and conversational recommendation for XR environments under supervision of Prof. Scott Sanner.
- Co-authored 8 peer-reviewed publications at ACL, ICLR, AAAI, EMNLP, UMAP, and other venues; active contributor to multiple concurrent research projects spanning NLP, ML, and embodied AI.

Part-Time Research Assistant | Department of Human Biology, University of Toronto — Sep 2023 – Sep 2025

- Analyzed 100,000+ encrypted student course records using Python (NumPy, Pandas, Scikit-Learn) to support large-scale educational research.
- Produced executive-level visualizations (Seaborn, Plotly) communicating evidence-based findings to academic decision-makers.

Teaching Experience

Teaching Assistant / Head TA | University of Toronto, Toronto, ON — Sep 2023 – Present

- Recipient of the **MIE Teaching Assistant Award 2024–2025** for outstanding contributions to graduate-level instruction.
- Designed comprehensive tutorial materials and course projects for three advanced courses in information retrieval, recommendation systems, and machine learning.
- Led weekly tutorial sessions for 100+ students; delivered practical Python demonstrations and provided individualized academic support.
- *Courses:* MIE451 – Decision Support Systems | MIE370 – Introduction to Machine Learning | MIE223 – Introduction to Data Science *(Head TA)*

Teaching Assistant | University of Waterloo, Waterloo, ON — Sep 2021 – Dec 2021

Academic Service

- *Journal Reviewer:* ACM Transactions on Recommender Systems (TORS)

Research Interests & Technical Skills

Research Interests: Egocentric situated information retrieval; conversational recommendation systems; memory-augmented LLM agents; Extended Reality (XR) and embodied AI; knowledge graph-based memory; structured reasoning and planning.

Programming & Tools: Python (PyTorch, NumPy, Pandas, Scikit-Learn, PySpark, SQL); Transformer and LLM architectures; LP/MILP optimization; NLP and dialogue modeling; Linux-based research workflows; Git.

Transferable Skills: Academic communication; research mentorship; curriculum design; critical thinking; cross-disciplinary collaboration; conference presentation.