Chengkai Liu

liuchengkai@tamu.edu | chengkai-liu.github.io | github.com/chengkai-liu

Education

Texas A&M University (TAMU) College Station, TX
Ph.D. student in Computer Science, advised by Prof. **James Caverlee** Aug. 2022 – Present

Shanghai Jiao Tong University (SJTU) Shanghai, China
B.Eng. in Computer Science, advised by Prof. **Yong Yu** Sept. 2018 – June 2022
- Member of **ACM Honors Class**, a pilot CS program for top talented students.

Research Interests

- **Efficient Recommender Systems**
- **(Multimodal) Large Language Models for Recommendation**
- **Generative Models for Recommendation** (e.g., Diffusion Models, Flow Matching)

Industry Experience

Amazon Prime Video Seattle, WA
Applied Scientist Intern, mentored by Drs. **Yan Fu** and **Huiyuan Chen**. May 2025 – Aug. 2025
- Developing multimodal large language models for recommendation and reranking in Amazon Prime Video.
- Incorporating cover art and visual signals to enhance diversity in multimodal recommendation.

Research Experience

Flow Matching for Recommendation. Developed a flow-based collaborative filtering framework and tailored flow matching to unique challenges in recommendation, achieving stable training and fast inference. Paper accepted to KDD'25.

Efficient Sequential Recommendation. Developed efficient sequential recommender systems using linear RNNs and state space models (e.g., Mamba), which delivers strong recommendation performance, efficient training, and low-cost fast inference. Papers accepted to CIKM'24 and RelKD@KDD'24. Delivered an invited talk at Uber.

Diffusion Models for Periodic Material Generation. Designed symmetry-aware score-based diffusion models to enhance performance in generating periodic material with optimized specific properties. Paper accepted to NeurIPS'23.

Multi-Behavior Recommendation. Developed Transformer-based multi-behavior recommenders that effectively model multi-behavior dependencies and diverse multi-behavior sequential dynamics, significantly improving recommendation performance. Paper accepted to SIGIR'22.

Selected Publications [Google Scholar]

Flow Matching for Collaborative Filtering
- **Chengkai Liu**, Yangtian Zhang, Jianling Wang, Rex Ying, James Caverlee
- KDD 2025 [paper] [code]
- **Presented at Meta PhD Forum 2025**

Behavior-Dependent Linear Recurrent Units for Efficient Sequential Recommendation
- **Chengkai Liu**, Jianghao Lin, Hanzhou Liu, Jianling Wang, James Caverlee
- CIKM 2024 [paper] [code]

Mamba4Rec: Towards Efficient Sequential Recommendation with Selective State Space Models
- **Chengkai Liu**, Jianghao Lin, Jianling Wang, Hanzhou Liu, James Caverlee
- RelKD@KDD 2024 **(Best Paper Award)** [paper] [code]
- **Invited talk at Uber** on *Mamba4Rec and Efficient Sequential Recommendation* in July 2024

DisastIR: A Comprehensive Information Retrieval Benchmark for Disaster Management
- Kai Yin, Xiangjue Dong, **Chengkai Liu**, Lipai Huang, Yiming Xiao, Zhewei Liu, Ali Mostafavi, James Caverlee
- EMNLP 2025 Findings [paper] [code]

I want a horror – comedy – movie: Slips-of-the-Tongue Impact Conversational Recommender System Performance
- Maria Teleki, Lingfeng Shi, **Chengkai Liu**, and James Caverlee

- Internspeech 2025 [paper] [code]

TwinCL: A Twin Graph Contrastive Learning Model for Collaborative Filtering
- **Chengkai Liu**, Jianling Wang, James Caverlee
- arXiv 2024 [paper] [code]

Towards Symmetry-Aware Generation of Periodic Materials
- Youzhi Luo, **Chengkai Liu**, Shuiwang Ji
- NeurIPS 2023 **(Spotlight)** [paper] [code]

Talks

- **Towards Efficient Sequential Recommendation**, Uber, July 2024
- **Linear Recurrence and Linear Attention in the Era of LLMs**, RAISE AI Seminar, TAMU, Oct. 2024

Other Publications and Preprints

Multi-Behavior Sequential Transformer Recommender
- Enming Yuan, Wei Guo, Zhicheng He, Huifeng Guo, **Chengkai Liu**, Ruiming Tang
- SIGIR 2022 [paper] [code]

DMRetriever: A Family of Models for Improved Text Retrieval in Disaster Management
- Kai Yin, Xiangjue Dong, **Chengkai Liu**, Allen Lin, Lingfeng Shi, Ali Mostafavi, James Caverlee
- arXiv 2025 [paper][code]

A Survey on Diffusion Models for Recommender Systems
- Jianghao Lin, Jiaqi Liu, Jiachen Zhu, Yunjia Xi, **Chengkai Liu**, Yangtian Zhang, Yong Yu, Weinan Zhang
- arXiv 2024 [paper] [repo]

CrisisSense-LLM: Instruction Fine-Tuned Large Language Model for Multi-label Social Media Text Classification in Disaster Informatics
- Kai Yin, Bo Li, **Chengkai Liu**, Ali Mostafavi, Xia Hu
- arXiv 2024 [paper][code]

XYScanNet: An Interpretable State Space Model for Perceptual Image Deblurring
- Hanzhou Liu, **Chengkai Liu**, Jiacong Xu, Peng Jiang, Mi Lu
- NTIRE@CVPR 2025 [paper] [code]

DeblurDiNAT: A Generalizable Transformer for Perceptual Image Deblurring
- Hanzhou Liu, Binghan Li, **Chengkai Liu**, Mi Lu
- arXiv 2024 [paper] [code]

Honors and Awards

- Invited Participant, Meta PhD Forum 2025 — 2025
- Best Paper Award for KDD 2024 Resource-efficient Learning for Knowledge Discovery Workshop — 2024
- TAMU CSE Department Travel Award — 2023, 2024
- Academic Excellence Scholarship, SJTU — 2019 - 2022
- Zhiyuan Honors Scholarship (Top 5% at SJTU) — 2018 - 2021

Academic Service

- **Conference Reviewer**: CIKM'23-24, KDD'24-26, NeurIPS'24-25, ICLR'25-26, ICML'25, SIGIR'25, WWW'25, AISTATS'25-26, ICWSM'25, AAAI'26.
- **Journal Reviewer**: IEEE TKDE, IEEE TIST, ACM TKDD.

Technical Skills

- **Programming Languages**: Python, C/C++, Java.
- **Deep Learning**: PyTorch, TensorFlow, Hugging Face.