

Ning Tang

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EDUCATION

Fudan University

M.S., Data Science, School of Management

Shanghai, China

Aug. 2024 – June 2026

University of California, Berkeley

Visiting Student, Math&Statistics

Berkeley, CA

Aug. 2022 – Jan. 2023

- GPA: 4.00/4.00

Shanghai University of Finance and Economics

B.S., Mathematics, Honored Degree

Shanghai, China

Aug. 2020 – June 2024

- GPA: 3.86/4.00, Ranking 1/102

PUBLICATIONS & PREPRINTS

Hanyang Yuan*, **Ning Tang***, Tongya Zheng, Jiarong Xu, Xintong Hu, Renhong Huang, Shunyu Liu, Jiacong Hu, Jiawei Chen, Mingli Song. *Tree of Preferences for Diversified Recommendation*. [NeurIPS 2025]

Renhong Huang*, **Ning Tang***, Jiarong Xu, Yuxuan Cao, Qingqian Tu, Sheng Guo, Bo Zheng, Yang Yang. *PolicySim: An LLM-Based Agent Social Simulation Sandbox for Proactive Policy Optimization*. (WWW'26 Under Review)

Xiaofeng Shi, Qian Kou, Yuduo Li, **Ning Tang**, Jinxin Xie, Longbin Yu, Songjing Wang, Hua Zhou. *SciSage: A Multi-Agent Framework for High-Quality Scientific Survey Generation*. [paper]

RESEARCH EXPERIENCE

Tree of Preferences for Diversified Recommendation.

Dec. 2024 – May. 2025

Fudan University

Instructor: Jiarong Xu

- Proposed **ToP-Rec**, a novel approach that explores diversified recommendation from a data-bias perspective, aiming to enhance diversity while maintaining relevance with expertise from LLMs.
- Designed the **Tree of Preferences** to model fine-grained user interests, serving as a vehicle for LLMs to uncover underexplored preferences from observed behaviors. Synthetic interactions are generated to supplement existing data, training a general recommender for diversified suggestions.
- Extensive experiments on three real-world datasets show that ToP-Rec achieves advantages in both diversity and relevance in most cases, with a **dominant trade-off** and efficient inference latency compared to baselines.

PolicySim: LLM-Based Social Simulation for Policy Optimization

Oct. 2024 – Feb. 2025

Fudan University

Instructor: Jiarong Xu

- Proposed **PolicySim**, a multi-agent social simulation sandbox that jointly models user agents and intervention policies. To enhance simulation performance, we design a social-agent training paradigm combining SFT and DPO, ensuring behavioral alignment with platform data and diverse of user intents.
- Develop an adaptive intervention policy using a **contextual bandit** framework that balances exploration and exploitation, augmented with message passing to capture dynamic network structures and information flows.
- Conducted extensive experiments across multiple datasets to verify the realism of agent behaviors and the effectiveness of intervention optimization, showing that PolicySim enables scalable and proactive evaluation of intervention policies.

Implicit Regularization in Over-parameterized Sparse Regression

Dec. 2023 – May. 2024

Shanghai University of Finance and Economics

Instructor: Jiyuan Tu

- Extended the second-order over-parameterization method of regression coefficients to a general **N-order scenario**, proving that under the RIP (Restricted Isometry Property) condition, the sparse regression solution achieves **minimax optimal convergence rate**.

*Equal contribution.

- Derived quantitative relationships between hyperparameters and provided a probabilistic formulation of the convergence theorems under both ℓ_1 and ℓ_2 norms, completing the proof using **element-wise dynamic evolution** of parameters.
- Conducted numerical simulations to validate the hyperparameter constraints and the magnitude of early stopping intervals with respect to the hyperparameters, demonstrating the numerical stability of the theorems and concluded with a detailed experimental analysis.

In context learning of large language models

Feb. 2023 – May. 2023

Center for Statistics, Tsinghua University, Research Assistant

Instructor: Pengkun Yang

- Pre-trained a transformer model on a controlled dataset, **GINC**, which follows a mixture of HMM distribution and showed its ICL capability on a **OOD** (Out of Distribution) downstream classification task.
- Fitted a Bayesian estimator by **Baum-Welch** algorithm to the dataset and showed the numerical consistency with the transformer estimator.
- Collected a survey regarding the Bayesian Inference framework for theoretical explanation of LLM's ICL ability.

INDUSTRIAL EXPERIENCE

Beijing Academy of Artificial Intelligence, BAAI

May 2025 – Present

Multimodal LLMs, Research Intern

Multimodal Graph RAG(working paper)

- Proposed a novel hierarchical construction for Multi-modal Knowledge Graph(MMKG) enabling efficient multi-hop and multi-granularity retrieval, with built-in support for dynamic graph index updates.
- Trained an RL-based agent to guide graph search during retrieval, deciding optimal paths and selecting relevant multimodal data.

Hello Bike Co.Ltd, Shanghai

May 2024 – Sep. 2024

NLP Group, Algorithm Internship

- Designed and implemented a hybrid quality inspection system combining lightweight retrieval models, rule-based filters, and LLM post-processing to precision and coverage.
- Built a scalable dataset generation framework to support fine-tuning of downstream models and deployed the system with distributed inference (DaC + ToT) to ensure stability.
- Built and optimized a domain-specific knowledge RAG system, supporting heterogeneous document processing and hybrid retrieval.

SELECTED AWARDS

Bachelor in Science, honored degree

2024.6

National Scholarship, Ministry of Education, PR China

2022.10

Undergraduate Mathematical Contest in Modeling, National Second Prize

2021.10

TECHNICAL SKILLS

Coding Languages: Python, Java, SQL, R, Matlab

Frameworks: Spark, Hadoop, Pytorch, LlamaIndex

Languages: English(TOEFL: 107), Chinese

RESEARCH INTEREST

MARL, LLM, GNNs, Statistical Machine Learning