# WENTAO SHI

0086-17398383678 • shiwentao123@mail.ustc.edu.cn • Google Scholar • GitHub • Homepage

## EDUCATION

**University of Science and Technology of China**, Hefei, China 09/2021 – 07/2026 (expected)

PhD candidate in Electronic and Information Engineering, School of Information Science and Technology

**University of Science and Technology of China**, Hefei, China 09/2017 – 07/2021

B.Eng. in Electronic and Information Engineering, School of Information Science and Technology,
GPA: 4.04/4.3, Rank: 4/311

## PUBLICATIONS

- **Wentao Shi**, Jiawei Chen, Fuli Feng, Jizhi Zhang, Junkang Wu, Chongming Gao, & Xiangnan He, "On the Theories Behind Hard Negative Sampling for Recommendation", in the 2023 ACM Web Conference **(WWW 2023)**, [pdf] [codes]
- **Wentao Shi**, Junkang Wu, Xuezhi Cao, Jiawei Chen, Wenqiang Lei, Wei Wu, Xiangnan He, "FFHR: Fully and Flexible Hyperbolic Representation for Knowledge Graph Completion", under review in IEEE Transactions on Knowledge and Data Engineering, [pdf]
- Junkang Wu, **Wentao Shi**, Xuezhi Cao, Jiawei Chen, Wenqiang Lei, Fuzheng Zhang, Wei Wu, & Xiangnan He, "DisenKGAT: Knowledge graph embedding with disentangled graph attention network", in Proceedings of the 30th ACM International Conference on Information and Knowledge Management (**CIKM 2021**) , [pdf] [codes]

## SELECTED PROJECTS & RESEARCH

**Project**: Explore hyperbolic space embedding for knowledge graph 09/2020 - 04/2021

**Advisor:** Prof. Xiangnan He (USTC), Prof. Jiawei Chen(ZJU), Dr. Xuezhi Cao (Meituan)

- Design a novel hyperbolic graph neural network FPM-GCN, which defines all operations on hyperbolic space without approximation.
- Propose Hyperbolic Inner Product (HIN) — a hyperbolic generalization of Euclidean inner product, which is more flexible in modeling complex data patterns.

**Project**: Explore disentangled representation for knowledge graph 04/2021 - 07/2021

**Advisor:** Prof. Xiangnan He (USTC), Prof. Jiawei Chen (ZJU), Dr. Xuezhi Cao (Meituan)

- Propose a novel Disentangled knowledge graph convolutional network to learn the disentangled embedding for knowledge graphs.
- Design a special relation-aware aggregation mechanism to achieve micro-disentanglement of entities, and design a mutual information-based regularization to achieve macro-disentanglement of the component distribution level.

**Project**: Investigate hard negative sampling for Recommendation System 01/2022 - 10/2022

**Advisor:** Prof. Xiangnan He (USTC), Prof. Jiawei Chen (ZJU), Prof. Fuli Feng (USTC)

- Establish the theoretical foundations for Hard negative sampling for Recommendation, explaining its superior performance.
- Conduct theoretical analyses, simulation studies, and real world experiments, to justify the connection between OPAUC and Top-$K$ metrics.

**Project**: Out-of-Distribution problem in Computer Vision and Recommendation System 11/2022 - now

**Advisor:** Prof. Xiangnan He(USTC), Prof. Fuli Feng (USTC)

- Propose a novel temporal distributional robust optimization method to tackle the temporal distribution shift problem in various fields.
- Investigate the pros and cons of different existing invariant learning methods.

## EXPERIENCE

**Meituan** Beijing, China

Research Intern, Advisor: Prof. Xiangnan He, Prof. Jiawei Chen, Dr. Xuezhi Cao 09/2020 – 09/2021

- Research on efficient embedding and adaptive reasoning of large-scale product knowledge graphs, using hyperbolic space and disentangle technology and accomplishing two papers.
- Improve the embedding and reasoning capabilities of knowledge graphs, serving millions of people and achieving significant online improvement

**University of Technology Sydney** Sydney, Australia

Summer Research Intern, Advisor: Prof. Min Xu 07/2019 – 09/2019

- Build a multi-view scene analysis and understanding platform, using deep neural network to automatically analyze youth football matches.
- Add pose-based re-id method under the Mask RCNN framework and present a mixed model for object detection.
- Implement video segmentation, target tracking, technical statistics, and other functions to enable the project to have automated analysis capabilities

## Professional Services & Awards

- **Invited Reviewer** for ACM Transactions on Information Systems (**TOIS**), and IEEE Transactions on Knowledge and Data Engineering (**TKDE**).
- First Class Academic Scholarship, USTC, China 2021 & 2022
- Guo Moruo Scholarship, USTC, China (Highest Scholarship in USTC, for top 1% students) 2021
- National Scholarship, Ministry of Education of China, China (for top 2% students) 2018
- Tang Lixin Scolarship, Tang Lixin Education Development Fund, China (for top 2% students) 2018

## Selected Courses

- **Mathematics and Physics:** Linear Algebra B1 (95/100), Calculus for Functions of Several Variables (97/100), Probability and Statistics B (100/100), Electromagnetism (99/100), Mechanics and Thermal Physics (100/100), Optics and Atomic Physics (100/100)
- **Major**: Computer Programming A (99/100), Basic Circuit Theory (99/100), Signal and Systems (97/100), Stochastic Processes B (97/100), Data Structure and Algorithm (97/100), Linear Electronic Circuits (98/100)

## Skills

**Programming Languages:** Python, C, C++, Matlab
**Tools and Frameworks:** PyTorch, Git, LaTeX
**English:** TOEFL: 90 (R: 25; L: 26; S: 17; W: 22);