

Hongwei Wang

Senior Researcher, Tencent AI Lab Seattle

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Research Interests

My general research area is applied machine learning for natural language processing and interconnected systems. Applications include large language models, retrieval augmented generation, information retrieval, representation learning, knowledge graphs, recommender systems, and social networks.

Experience

Tencent AI Lab Seattle

Senior Researcher

Research Area: Large language models, retrieval augmented generation, representation learning

Bellevue, WA

Apr. 2022 – present

University of Illinois Urbana–Champaign

Post-doctoral Researcher

Advisor: Prof. Heng Ji, Prof. Jiawei Han

Research Area: Graph-based machine learning for natural language processing

Urbana, IL

Mar. 2021 – Apr. 2022

Stanford University

Post-doctoral Researcher

Advisor: Prof. Jure Leskovec, Prof. Stefano Ermon

Research Area: Graph neural networks, knowledge graphs, multi-agent reinforcement learning

Stanford, CA

Mar. 2019 – Mar. 2021

Education

Shanghai Jiao Tong University

Ph.D. in Computer Science

Advisor: Prof. Minyi Guo

Thesis: Network Representation Learning Based Recommender Systems

Awards: 2020 CCF (China Computer Federation) Outstanding Doctoral Dissertation Award (10 in total),

2018 Google Ph.D. Fellowship (6 in East Asia, 57 in total),

2018 National Scholarship (ranking: 1/~200)

Shanghai

Sep. 2014 – Dec. 2018

Shanghai Jiao Tong University

B.E. in Computer Science (ACM Class)

Advisor: Prof. Yong Yu

Thesis: Real-time Monitoring and Protection of User Privacy on Smartphones

GPA: 3.9/4.3, ranking: 2/29

Minor in Finance (Thesis: Risk-free Arbitrage in China Stock Options Market)

Shanghai

Sep. 2010 – Jun. 2014

Preprints

[P2] *Dense X Retrieval: What Retrieval Granularity Should We Use?*

Tong Chen, **Hongwei Wang**, Sihao Chen, Wenhao Yu, Kaixin Ma, Xinran Zhao, Hongming Zhang, Dong Yu.

arXiv Preprint, 2023.

[P1] *Chain-of-Note: Enhancing Robustness in Retrieval-Augmented Language Models*

Wenhao Yu, Hongming Zhang, Xiaoman Pan, Kaixin Ma, **Hongwei Wang**, Dong Yu.

arXiv Preprint, 2023.

Conference Publications

[C31] *Sub-Sentence Encoder: Contrastive Learning of Propositional Semantic Representations*

Sihao Chen, Hongming Zhang, Tong Chen, Ben Zhou, Wenhao Yu, Dian Yu, Baolin Peng, **Hongwei Wang**, Dan Roth, Dong Yu.

The 2024 Annual Conference of the North American Chapter of the Association for Computational Linguistics (NAACL), 2024.

[C30] *SemStamp: A Semantic Watermark with Paraphrastic Robustness for Text Generation*

Abe Bohan Hou, Jingyu Zhang, Tianxing He, Yichen Wang, Yung-Sung Chuang, **Hongwei Wang**, Lingfeng Shen, Benjamin Van Durme, Daniel Khashabi, Yulia Tsvetkov.

The 2024 Annual Conference of the North American Chapter of the Association for Computational Linguistics (NAACL), 2024.

- [C29] *LASER: LLM Agent with State-Space Exploration for Web Navigation*
Kaixin Ma, Hongming Zhang, **Hongwei Wang**, Xiaoman Pan, Dong Yu.
Workshop on Foundation Models for Decision Making (FMDM@NeurIPS), 2023
- [C28] *On the Dimensionality of Sentence Embeddings*
Hongwei Wang, Hongming Zhang, Dong Yu.
The 2023 Conference on Empirical Methods in Natural Language Processing (EMNLP), 2023. Finding paper.
- [C27] *Unsupervised Multi-document Summarization with Holistic Inference*
Haopeng Zhang, Sangwoo Cho, Kaiqiang Song, Xiaoyang Wang, **Hongwei Wang**, Jiawei Zhang, Dong Yu.
The 13th International Joint Conference on Natural Language Processing and the 3rd Conference of the Asia-Pacific Chapter of the Association for Computational Linguistics (IJCNLP-AAACL), 2023.
- [C26] *Generating User-Engaging News Headlines*
Pengshan Cai, Kaiqiang Song, Sangwoo Cho, **Hongwei Wang**, Xiaoyang Wang, Hong Yu, Fei Liu, Dong Yu.
The 61st Annual Meeting of the Association for Computational Linguistics (ACL), 2023.
- [C25] *Going Beyond Sentence Embeddings: A Token-Level Matching Algorithm for Calculating Semantic Textual Similarity*
Hongwei Wang, Dong Yu.
The 61st Annual Meeting of the Association for Computational Linguistics (ACL), 2023. Short paper.
- [C24] *Schema-Guided Event Graph Completion*
Hongwei Wang, Zixuan Zhang, Sha Li, Jiawei Han, Yizhou Sun, Hanghang Tong, Joseph P Olive, Heng Ji.
The 4th Conference on Automated Knowledge Base Construction (AKBC), 2022.
- [C23] *RESIN-11: Schema-guided Event Prediction for 11 Newsworthy Scenarios*
Xinya Du, Zixuan Zhang, Sha Li, Ziqi Wang, Pengfei Yu, **Hongwei Wang**, Tuan Manh Lai, Xudong Lin, Iris Liu, Ben Zhou, Haoyang Wen, Manling Li, Darryl Hannan, Jie Lei, Hyoungun Kim, Rotem Dror, Haoyu Wang, Michael Regan, Qi Zeng, Qing Lyu, Charles Yu, Carl Edwards, Xiaomeng Jin, Yizhu Jiao, Ghazaleh Kazeminejad, Zhenhailong Wang, Chris Callison-Burch, Carl Vondrick, Mohit Bansal, Dan Roth, Jiawei Han, Shih-Fu Chang, Martha Palmer, Heng Ji
Annual Conference of the North American Chapter of the Association for Computational Linguistics (NAACL), 2022. Demo paper.
- [C22] *Chemical-Reaction-Aware Molecule Representation Learning*
Hongwei Wang, Weijiang Li, Xiaomeng Jin, Kyunghyun Cho, Heng Ji, Jiawei Han, Martin D. Burke
The 10th International Conference on Learning Representations (ICLR), 2022.
- [C21] *Event-Enhanced Knowledge Graph Embedding*
Zixuan Zhang, **Hongwei Wang**, Han Zhao, Hanghang Tong, Heng Ji.
The 2021 Conference on Empirical Methods in Natural Language Processing (EMNLP), 2021. Finding paper.
- [C20] *Multi-agent Imitation Learning with Copulas*
Hongwei Wang, Lantao Yu, Zhangjie Cao, Stefano Ermon.
The 33rd European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML-PKDD), 2021.
- [C19] *Relational Message Passing for Knowledge Graph Completion*
Hongwei Wang, Hongyu Ren, Jure Leskovec.
The 27th ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD), 2021.
- [C18] *Distance Encoding: Design Provably More Powerful GNNs for Structural Representation Learning*
Pan Li, Yanbang Wang, **Hongwei Wang**, Jure Leskovec.
The 34th Conference on Neural Information Processing Systems (NeurIPS), 2020.
- [C17] *STGCN: A Spatial-temporal Aware Graph Learning Method for POI Recommendation*
Haoyu Han, Mengdi Zhang, Min Hou, Fuzheng Zhang, Zhongyuan Wang, **Hongwei Wang**, Enhong Chen, Jianhui Ma, Qi Liu.
The 20th IEEE International Conference on Data Mining (ICDM), 2020.
- [C16] *Knowledge-aware Graph Neural Networks with Label Smoothness Regularization for Recommender Systems*
Hongwei Wang, Fuzheng Zhang, Mengdi Zhang, Jure Leskovec, Miao Zhao, Wenjie Li, Zhongyuan Wang.
The 25th ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD), 2019. **Oral presentation.**
- [C15] *Lipschitz Generative Adversarial Nets*

- Zhiming Zhou, Jiadong Liang, Yuxuan Song, Lantao Yu, **Hongwei Wang**, Weinan Zhang, Yong Yu, Zhihua Zhang.
The 36th International Conference on Machine Learning (ICML), 2019.
- [C14] *Knowledge Graph Convolutional Networks for Recommender Systems*
Hongwei Wang, Miao Zhao, Xing Xie, Wenjie Li, Minyi Guo.
The 28th Web Conference (WWW), 2019. Short paper.
- [C13] *Multi-task Feature Learning for Knowledge Graph Enhanced Recommendation*
Hongwei Wang, Fuzheng Zhang, Miao Zhao, Wenjie Li, Xing Xie, Minyi Guo.
The 28th Web Conference (WWW), 2019. **Oral presentation.**
- [C12] *AdaShift: Decorrelation and Convergence of Adaptive Learning Rate Methods*
Zhiming Zhou, Qingru Zhang, Guansong Lu, **Hongwei Wang**, Weinan Zhang, Yong Yu.
The 7th International Conference on Learning Representations (ICLR), 2019.
- [C11] *Modeling Local Dependence in Natural Language with Multi-channel Recurrent Neural Networks*
Chang Xu, Weiran Huang, **Hongwei Wang**, Wang Gang, Tiejian Liu.
The 33rd AAAI Conference on Artificial Intelligence (AAAI), 2019.
- [C10] *RippleNet: Propagating User Preferences on the Knowledge Graph for Recommender Systems*
Hongwei Wang, Fuzheng Zhang, Jialin Wang, Miao Zhao, Wenjie Li, Xing Xie, Minyi Guo.
The 27th ACM International Conference on Information and Knowledge Management (CIKM), 2018. **Highly cited paper in CIKM'18.**
- [C9] *Weakly-supervised Generative Adversarial Nets with Auxiliary Information for Wireless Coverage Estimation*
Zhuo Li, **Hongwei Wang**, Miao Zhao.
The 27th ACM International Conference on Information and Knowledge Management (CIKM), 2018. Short paper.
- [C8] *DKN: Deep Knowledge-aware Network for News Recommendation*
Hongwei Wang, Fuzheng Zhang, Xing Xie, Minyi Guo.
The 27th Web Conference (WWW), 2018. **Highly cited paper in WWW'18.**
- [C7] *Deep Representation-decoupling Neural Networks for Monaural Music Mixture Separation*
Zhuo Li, **Hongwei Wang**, Miao Zhao, Wenjie Li, Minyi Guo.
The 32nd AAAI Conference on Artificial Intelligence (AAAI), 2018.
- [C6] *GraphGAN: Graph Representation Learning with Generative Adversarial Nets*
Hongwei Wang, Jia Wang, Jialin Wang, Weinan Zhang, Miao Zhao, Fuzheng Zhang, Xing Xie, Minyi Guo.
The 32nd AAAI Conference on Artificial Intelligence (AAAI), 2018. **Oral presentation, highly cited paper in AAAI'18.**
- [C5] *SHINE: Signed Heterogeneous Information Network Embedding for Sentiment Link Prediction*
Hongwei Wang, Fuzheng Zhang, Min Hou, Xing Xie, Minyi Guo, Qi Liu.
The 11th ACM International Conference on Web Search and Data Mining (WSDM), 2018.
- [C4] *Joint Topic-semantic-aware Social Recommendation for Online Voting*
Hongwei Wang, Jia Wang, Miao Zhao, Jiannong Cao, Minyi Guo.
The 26th ACM International Conference on Information and Knowledge Management (CIKM), 2017.
- [C3] *Practical Lessons for Job Recommendations in the Cold-Start Scenario*
Jianxun Lian, Fuzheng Zhang, Min Hou, **Hongwei Wang**, Xing Xie, Guangzhong Sun.
The 11th ACM Conference on Recommender Systems (RecSys), 2017.
- [C2] *MELODY: A Long-term Dynamic Quality-aware Incentive Mechanism for Crowdsourcing*
Hongwei Wang, Song Guo, Jiannong Cao, Minyi Guo.
The 37th IEEE International Conference on Distributed Computing Systems (ICDCS), 2017.
- [C1] *Towards Scalable and Reliable In-memory Storage System: A Case Study with Redis*
Shanshan Chen, Xiaoxin Tang, **Hongwei Wang**, Han Zhao, Minyi Guo.
The 10th IEEE International Conference on Big Data Science and Engineering (BigDataSE), 2016.

Journal Publications

- [J9] *Combining Graph Convolutional Neural Networks and Label Propagation*
Hongwei Wang, Jure Leskovec.
ACM Transactions on Information Systems (TOIS), 2021.
- [J8] *Joint Topic-semantic-aware Social Matrix Factorization for Online Voting Recommendation*

Jia Wang*, **Hongwei Wang*** (equal contribution), Miao Zhao, Jiannong Cao, Zhuo Li, Minyi Guo. Knowledge-Based Systems, 2020.

- [J7] *Recurrent Memory Networks: Modeling Long Short-term User Preferences for Session-based Recommendation*
Hongwei Wang, Minyi Guo.
SCIENTIA SINICA Informationis, 2020.
- [J6] *Learning Graph Representation with Generative Adversarial Nets*
Hongwei Wang, Jia Wang, Jialin Wang, Weinan Zhang, Miao Zhao, Fuzheng Zhang, Xing Xie, Minyi Guo.
IEEE Transactions on Knowledge and Data Engineering (TKDE), 2019.
- [J5] *Visual-textual Emotion Analysis with Deep Coupled Video and Danmu Neural Networks*
Chenchen Li, Jialin Wang, **Hongwei Wang**, Miao Zhao, Wenjie Li, Xiaotie Deng.
IEEE Transactions on Multimedia (TMM), 2019.
- [J4] *Sparsely Self-supervised Generative Adversarial Nets for Radio Frequency Estimation*
Zhuo Li, Jiannong Cao, **Hongwei Wang**, Miao Zhao.
IEEE Journal on Selected Areas in Communications (JSAC), 2019.
- [J3] *Exploring High-order User Preference on the Knowledge Graph for Recommender Systems*
Hongwei Wang, Fuzheng Zhang, Jialin Wang, Miao Zhao, Wenjie Li, Xing Xie, Minyi Guo.
ACM Transactions on Information Systems (TOIS), 2019.
- [J2] *MELODY: A Long-term Dynamic Quality-aware Incentive Mechanism for Crowdsourcing*
Hongwei Wang, Song Guo, Jiannong Cao, Minyi Guo.
IEEE Transactions on Parallel and Distributed Systems (TPDS), 2018.
- [J1] *Collaborative Filtering Based Recommendation of Online Social Voting*
Xiwang Yang, Chao Liang, Miao Zhao, **Hongwei Wang**, Hao Ding, Yong Liu, Yang Li, Junlin Zhang.
IEEE Transactions on Computational Social Systems (TCSS), 2017.

Tutorials

- [T2] *New Frontiers of Scientific Text Mining: Tasks, Data, and Tools*
Xuan Wang, **Hongwei Wang**, Heng Ji, Jiawei Han.
The 28th ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD), 2022.
- [T1] *Modern Natural Language Processing Techniques for Scientific Web Mining: Tasks, Data, and Tools*
Xuan Wang, **Hongwei Wang**, Heng Ji, Jiawei Han.
The 31st Web Conference (WWW), 2022.

Invited Talks

- o *Knowledge graph-enhanced recommender system*
Coupang, online, January 2022.
- o *Chemical-Reaction-Aware Molecule Representation Learning*
ByteDance, online, October 2021.
- o *Graph Representation Learning: From Knowledge Graphs to Recommender Systems*
National University of Singapore, online, September 2021.
- o *Graph Representation Learning: From Knowledge Graphs to Recommender Systems*
North Carolina State University, online, September 2021.
- o *Graph Representation Learning and Its Applications in Recommender Systems*
ACM Class Student Academic Festival, online, June 2021.
- o *Knowledge-graph-enhanced Recommender Systems*
Microsoft Rising Stars Invited Talk, online, May 2021.
- o *Graph Representation Learning and Its Applications in Recommender Systems*
Brandeis University, online, April 2021.
- o *Knowledge-graph-aware Recommender Systems*
Datafun, online, March 2021.
- o *Knowledge-graph-aware Recommender Systems*
Jiangmen Capital, online, February 2020.
- o *Knowledge-graph-aware Recommender Systems*

JD.COM Silicon Valley Research Center, Mountain View, June 2019.

- *When Recommender System Meets Network Representation Learning*
ACM Class Student Academic Festival, Shanghai, June 2018.
- *Graph Representation Learning and GraphGAN*
PaperWeekly, online, January 2018.

Press Coverage

- Jiangmen: [Knowledge-graph-aware Recommender Systems](#).
- Xinmin Evening News: ["A-Class Project" in World Artificial Intelligence Conference](#).
- MSRA News: [Hongwei: "MSRA Is the Best Place for CS PhD in China"](#).
- Fudan Knowledge Workshop: [Network Representation Learning Based Recommender Systems](#).
- SJTU News: [CS PhD Candidate Hongwei Wang Won 2018 Google PhD Fellowship](#).
- Sohu News: [Recipients of 2018 Google PhD Fellowship Announced](#).
- PaperWeekly: [GAN in Network Representation Learning](#).

Honors & Awards

- **Most Influential Scholar Honorable Mention in Information Retrieval and Recommendation**, AMiner, 2024
- **Most Influential Scholar Honorable Mention in Information Retrieval and Recommendation**, AMiner, 2023
- **Most Influential Scholar Honorable Mention in Data mining**, AMiner, 2022
- **Most Influential Scholar Honorable Mention in Information Retrieval and Recommendation**, AMiner, 2022
- **CCF Outstanding Doctoral Dissertation Award (10 in total)**, China Computer Federation, 2020
- **Google Ph.D. Fellowship (6 in East Asia, 57 in total)**, Google Inc., 2018
- **National Scholarship (ranking: 1st / ~200)**, Ministry of Education of China, 2018
- **Tang Lixin Scholarship**, Shanghai Jiao Tong University, 2018
- **Overseas Alumni Doctoral Students Scholarship**, Shanghai Jiao Tong University, 2017
- **The 5th place in RecsysChallenge 2017**, RecSys Challenge, 2017
- **The 2nd prize of National Post-Graduate Mathematical Contest in Modeling**, GMCM Organizing Committee, 2015
- **The 3rd prize of National Post-Graduate Mathematical Contest in Modeling**, GMCM Organizing Committee, 2014
- **Outstanding Doctoral Freshman Scholarship**, Shanghai Jiao Tong University, 2014
- **SJTU Outstanding Undergraduate**, Shanghai Jiao Tong University, 2014
- **Arawana Scholarship**, Shanghai Jiao Tong University, 2013
- **Tung OOCL Scholarship**, Shanghai Jiao Tong University, 2012
- **The 2nd prize of National Undergraduate Mathematical Contest in Modeling (Shanghai District)**, China Society for Industrial and Applied Mathematics, 2012
- **The 2nd prize of National Undergraduate Physics Contest (Shanghai District)**, Shanghai Physical Society, 2011
- **The 3rd prize of National Senior High School Chemistry Contest (Anhui District)**, Anhui Chemical Society, 2009
- **The 3rd prize of National Senior High School Physics Contest**, Anhui Physical Society, 2009
- **The 1st prize of National Senior High School Mathematics Contest**, Chinese Mathematical Society, 2009

Professional Services

- **Mentor** for Stanford CS341 (Project in Mining Massive Data Sets), Stanford CURIS (Undergraduate Research Internship in Computer Science).
- **Teaching assistant** for SJTU CS377 (Project Workshop of Database System).
- **Conference reviewer / program committee member** for WWW (2019, 2020, 2021, 2022, 2023), AAI (2020, 2021, 2023, 2024), ECML-PKDD (2020, 2021, 2022, 2023), NeurIPS (2020, 2021, 2022, 2023), ICLR (2021, 2022, 2023, 2024), ICML (2021, 2022, 2023, 2024), NLPCC (2021, 2022, 2023), RecSys (2021), DSAA (2022), KDD (2022, 2023, 2024), WSDM(2023, 2024), SDM (2024).
- **Journal reviewer** for:
 - IEEE: Transactions on Neural Networks and Learning Systems (TNNLS), Transactions on Knowledge and Data

Engineering (TKDE), Access, Transactions on Pattern Analysis and Machine Intelligence (TPAMI), Intelligent Systems (IS);

- ACM: Transactions on Intelligent Systems and Technology (TIST), Transactions on the Web (TWEB), Transactions on Information Systems (TOIS), Computing Surveys (CSUR);
- Elsevier: Online Social Networks and Media (OSNEM), Information Sciences (INS), Journal of Parallel and Distributed Computing (JPDC), Information Processing and Management (IPM), Knowledge-Based Systems (KNOSYS), Pattern Recognition (PR), Neurocomputing (NEUCOM), Expert Systems With Applications (ESWA), Pervasive and Mobile Computing (PMC);
- Springer: World Wide Web Journal (WWWJ).

Internship & Visiting

Meituan-Dianping Group

Intern at NLP Center

Mentor: Dr. Fuzheng Zhang

Shanghai

Dec. 2018 – Jan. 2019

Microsoft Research Asia

Intern at Social Computing Group

Mentor: Dr. Xing Xie

Beijing

Sep. 2016 – Sep. 2018

The Hong Kong Polytechnic University

Research assistant at Internet and Mobile Computing Laboratory

Advisor: Prof. Jiannong Cao

Hong Kong

Mar. 2016 – Sep. 2016

Microsoft Research Asia

Intern at Mobile and Sensor System Group

Mentor: Dr. Feng Zhao

Beijing

Jul. 2013 – Apr. 2014

Last updated: May 3, 2024