

Muhao Chen

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Research Interests

Representation learning of multi-relational data. Commonsense knowledge representation. Natural language understanding. Bioinformatics.

EDUCATION

University of Pennsylvania, Philadelphia, USA

Postdoctoral Fellow

2019.7-Present

Host: Dan Roth

University of California, Los Angeles, USA

Ph.D. In Computer Science

2014.9-2019.6

Dissertation: Multi-relational Representation Learning and Knowledge Acquisition

Advisor: Carlo Zaniolo

Fudan University, Shanghai, China

B.S. in Computer Science

2010.9-2014.6

PUBLICATIONS

Refereed Journals

1. **Muhao Chen**[✉], Chelsea J. T. Ju^{*}, Guangyu Zhou, Tianran Zhang, Kai-Wei Chang, Carlo Zaniolo, Wei Wang. Multifaceted Protein-Protein Interaction Prediction Based on Siamese Residual RCNN. *Bioinformatics*, Oxford Academic. Special issues featuring ISMB, 2019.
2. Carlo Zaniolo[✉], Shi Gao, Maurizio Atzori, **Muhao Chen**, Jiaqi Gu. User-Friendly Temporal Queries on Historical Knowledge Bases. In *Information and Computation*. Elsevier, 2018.

Refereed Conference Proceedings

3. Junheng Hao, **Muhao Chen**, Wenchao Yu, Yizhou Sun, Wei Wang. Universal Representation Learning of Knowledge Bases by Jointly Embedding Ontological Concepts and Instances. In *Proceedings of the 25th ACM SIGKDD Conference ON Knowledge Discovery and Data Mining (KDD)*, 2019.
4. **Muhao Chen**, Chris Quirk. Embedding Edge-attributed Relational Hierarchies. In *Proceedings of the 42nd ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR)*, 2019.
5. Xuelu Chen, **Muhao Chen**, Weijia Shi[^], Yizhou Sun, Carlo Zaniolo. Uncertain Knowledge Graphs Embeddings. In the 33rd International Conference on Artificial Intelligence (AAAI), 2019.
6. Qingheng Zhang, Zequn Sun, Wei Hu, **Muhao Chen**, Lingbing Guo, Yuzhong Qu. Multi-view Knowledge Graph Embedding for Entity Alignment. In *Proceedings of the 28th International Joint Conference on Artificial Intelligence (IJCAI)*, 2019.
7. Yingtao Tian, Haochen Chen, Bryan Perozzi, **Muhao Chen**, Xiaofei Sun, Steven Skiena. Social Relation Inference via Label Propagation. In the 40th European Conference on Information Retrieval (ECIR), 2019.
8. Zequn Sun, Jiacheng Huang, Wei Hu, **Muhao Chen**, Yuzhong Qu. TransEdge: Translating Relation-contextualized Embeddings for Knowledge Graphs. In the 18th International Semantic Web Conference (ISWC), 2019.

9. Qi Zhao, **Muhao Chen**, Pengyuan Du, Tuan Le, Mario Gerla. Towards Efficient Cellular Traffic Offloading via Dynamic MPTCP Path Configuration with SDN. In *IEEE International Conference on Computing, Networking and Communications (ICNC)*, 2019.
10. **Muhao Chen**, Gang Huang, Changping Meng, Carlo Zaniolo. Neural Article Pair Modeling for Wikipedia Sub-article Matching. In *the 29th European Conference on Machine Learning (ECML)*, 2018 (**Plenary Presentation**, ~1.7% acceptance rate)
11. **Muhao Chen**, Yingtao Tian, Kai-Wei Chang, Steven Skiena, Carlo Zaniolo. Co-training Embeddings of Knowledge Graphs and Entity Descriptions for Cross-lingual Entity Alignment. In *the 27th International Joint Conference on Artificial Intelligence (IJCAI)*, 2018.
12. **Muhao Chen**, Yingtao Tian, Xuelu Chen, Zijun Xue, Carlo Zaniolo. On2Vec: Embedding-based Relation Prediction for Ontology Population. In *Proceedings of the 17th SIAM International Conference on Data Mining (SDM)*. SIAM, 2018
13. Haochen Chen, Xiaofei Sun, Yingtao Tian, Bryan Perozzi, **Muhao Chen** and Steven Skiena. Enhanced Network Embeddings via Exploiting Edge Labels. In *the 27th ACM Conference on Information and Knowledge Management (CIKM)*. ACM 2018.
14. Pengyuan Du, Seunghyun Yoo, Qi Zhao, **Muhao Chen**, Mario Gerla. Towards Opportunistic Resource Sharing in Mobile Social Networks - an Evolutionary Game Theoretic Approach. In *Proceedings of the 19th ACM International Symposium on Mobile Ad Hoc Networking and Computing (MobiHoc)*, ACM 2018.
15. **Muhao Chen**, Qi Zhao, Pengyuan Du, Carlo Zaniolo, Mario Gerla. Demand-driven Cache Allocation Based on Context-aware Collaborative Filtering. In *Proceedings of the 19th ACM International Symposium on Mobile Ad Hoc Networking and Computing (MobiHoc)*, ACM 2018.
16. **Muhao Chen**, Yingtao Tian, Mohan Yang, Carlo Zaniolo. Multilingual Knowledge Graph Embeddings for Cross-lingual Knowledge Alignment. In *Proceedings of the 26th International Joint Conference on Artificial Intelligence (IJCAI)*. 2017.
17. **Muhao Chen**, Carlo Zaniolo. Learning Multi-faceted Knowledge Graph Embeddings for Natural Language Processing. In *Proceedings of the 26th International Joint Conference on Artificial Intelligence (IJCAI)*. 2017 (Extended abstract)
18. **Muhao Chen**, Shi Gao, X. Sean Wang. Converting Spatiotemporal Data Among Heterogeneous Granularity Systems. In *Proceedings of the 25th IEEE International Conference on Fuzzy Systems (FUZZ-IEEE)*. IEEE, 2016
19. **Muhao Chen**, Shi Gao, Jingheng Zhou, X. Sean Wang. Converting Spatiotemporal Data Among Multiple Granularity Systems. In *Proceedings of the 31st ACM SIGAPP Symposium on Applied Computing (SAC)*. ACM, 2016.

Workshop and system demonstration papers

20. Pei Zhou[^], Weijia Shi[^], Jieyu Zhao, Kuan-Hao Huang, **Muhao Chen**, Kai-Wei Chang. Examining Gender Bias in Languages with Grammatical Gender. In *ICML AI for Social Good Workshop (AISG)*, 2019.
21. Weijia Shi[^], **Muhao Chen**, Yingtao Tian, Kai-Wei Chang. Learning Bilingual Word Embeddings Using Lexical Definitions. In *Proceedings of ACL Workshop on Representation Learning for NLP (RepL4NLP)*, 2019.
22. Changjun Fan, Yizhou Sun, Li Zeng, Yang-Yu Liu, **Muhao Chen**, Zhong Liu. Dismantle Large Networks through Deep Reinforcement Learning. In *ICLR Workshops*, 2019.
23. Yingtao Tian, Haochen Chen, Bryan Perozzi, **Muhao Chen**, Xiaofei Sun, Steven Skiena. Social Relation Inference via Label Propagation. In *the 14th KDD Workshop on Mining and Learning with Graphs (MLG)*, 2018.
24. Pei Zhou[^], **Muhao Chen**, Kai-Wei Chang, Carlo Zaniolo. Quantification and Analysis of Scientific Language Variation by Research Fields. In *Proceedings of the ICDM Workshops (ICDMW)*, 2018.
25. **Muhao Chen**, Tao Zhou, Pei Zhou[^], Carlo Zaniolo. Multi-graph Affinity Embeddings for Multilingual Knowledge Graphs. **Contributed talk** (3 of 22 accepted papers) in the *6th Workshop on Automated Knowledge Base Construction at NIPS (AKBC)*. 2017.
26. Tao Zhou, **Muhao Chen**, Demetri Terzopoulos, Jie Yu. Attention-based Natural Language Person Retrieval. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition Workshops (CVPRW)*. IEEE, 2017.
27. Shi Gao, **Muhao Chen**, Maurizio Atzori, Carlo Zaniolo. SPARQL^T and its User-Friendly Interface for Managing and Querying the History of Knowledge Bases. In *the 14th International Semantic Web Conference (ISWC)*, 2015 (demo).

In submission

28. **Muhao Chen**, Junheng Hao, Jyun-yu Jiang, Zijun Xue, Kai-Wei Chang, Yizhou Sun, Wei Wang. Latent Translational Dialogue State Tracking. In Submission to **EMNLP**, 2019.
29. Xuelu Chen, **Muhao Chen**, Yizhou Sun, Carlo Zaniolo. Cross-lingual Knowledge Graph Completion via Ensemble Embeddings. In Submission to **EMNLP**, 2019.
30. **Muhao Chen**^{*}, Weijia Shi^{*^}, Pei Zhou and Kai-Wei Chang. Retrofitting Contextualized Word Embeddings with Paraphrases. In Submission to **EMNLP**, 2019.
31. Pei Zhou[^], Weijia Shi[^], Jieyu Zhao, Kuan-Hao Huang, **Muhao Chen**, Ryan Cotterell, Kai-Wei Chang. Examining Gender Bias in Languages with Grammatical Gender. In Submission to **EMNLP**, 2019.
32. Haochen Chen, Syed Fahad Sultan, Yingtao Tian, **Muhao Chen**, Steven Skiena. Fast and Accurate Network Embeddings via Very Sparse Random Projection. In Submission to **CIKM**, 2019.
33. Changjun Fan, Yuhui Ding, Li Zeng, **Muhao Chen**, Yizhou Sun and Zhong Liu. Betweenness Centrality Estimation from Scratch: A Novel Graph Neural Network Based Approach. In Submission to **CIKM**, 2019.
34. **Muhao Chen**, Yingtao Tian, Haochen Chen, Kai-Wei Chang, Steve Skiena, Carlo Zaniolo. Learning to Represent Bilingual Dictionaries. arXiv:1808.03726. In submission to **CoNLL**
35. Changping Meng, **Muhao Chen**, Jie Mao, Bruno Ribeiro, Jennifer Neville. Readability Analysis of Web Articles Using Hierarchical Self-attention. In Submission to **ICDM**, 2019.
36. **Muhao Chen**, Gang Huang, Carlo Zaniolo. Learning to Differentiate Between Main-articles and Sub-articles in Wikipedia. In Submission to **ICDM**, 2019.
37. Guangyu Zhou^{*}, **Muhao Chen**^{*}, Chelsea J-T Ju^{*}, Zheng Wang, Jyun-yu Jiang, Wei Wang[✉]. Mutation Effect Estimation in Protein-Protein Interactions using Deep Contextualized Encoding. In Submission to **Bioinformatics**, OUP

^{*}Indicating equal contributions. [✉]Indicating contact authors. [^]Indicating advisee students.

PRESENTATIONS

1. Multi-relational representation learning and knowledge acquisition. *Invited talk at Stanford SNAP Seminar*. Jan 2019
2. Multi-relational representation learning and knowledge acquisition. *UCLA Machine Learning and Big Data Seminar*. Jan 2019
3. Neural Article Pair Modeling for Wikipedia Sub-article Matching. *Plenary talk at ECML 2018. Dublin, Ireland*. Sept 2018
4. Co-training Embeddings of Knowledge Graphs and Entity Descriptions for Cross-lingual Entity Alignment. *Conference talk at IJCAI 2018. Stockholm, Sweden*. July 2018
5. On2Vec: Embedding-based Relation Prediction for Ontology Population. *Conference talk at SDM 2018. San Diego, CA, USA*. May 2018
6. Multilingual Knowledge Graph Embeddings for Cross-lingual Knowledge Alignment. *Contributed talk at AKBC 2017. Longbeach, CA, USA*. Dec 2017
7. Neural Article Pair Modeling for Wikipedia Sub-article Matching. *Google Search Intelligence Seminar Talk*. Sept 2017
8. Multilingual Knowledge Graph Embeddings for Cross-lingual Knowledge Alignment. *Conference talk at IJCAI 2017. Melbourne, Australia*. Aug 2017
9. Converting Spatiotemporal Data Among Heterogeneous Granularity Systems. *Conference talk at FUZZ-IEEE 2016. Vancouver, Canada*. Aug 2016
10. Reasoning Across Multiple Spatiotemporal Granularity Systems. *Invited talk at Teradata Labs. El Segundo, CA, USA*. Mar 2015

ACADEMIC SERVICES

PC Member:

2019: AAAI, AKBC, NAACL, ACL, EMNLP-IJCNLP, IEEE BigData, NLPCC, WISE, ICSC.

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2018: AAAI, EMNLP, IEEE BigData, IEEE WETICE, NLPCC, SoCal NLP, IEEE AIKE.

Organization Committee: 2019: IEEE AIKE (Doctoral Consortium Co-chair)

Journal Reviewer: TKDD, Frontiers of Computer Science.

INTERNSHIPS

Research Intern, Microsoft Research, Redmond, WA (NLP Group) 2018.6-2018.9

- *Embedding Edge-attributed Relational Hierarchies*. [3]

Research Intern, Google, Mountain View, CA (Google Knowledge Graph) 2017.6~2017.9

- *Neural Article Pair Modeling for Large-scale Sub-article Relation Extraction from Wikipedia*. [11, 35, 36]

System SDE Intern, Google, Mountain View, CA (Procella Real-time Data Infrastructure) 2016.6~2016.9

- *Dynamic Shard-partitioning for Large-scale Windowed Event Streams*.

R&D Intern, Teradata Labs, Los Angeles, CA (Optimizer Group) 2015.6~2015.9

- *Multi-task Learning for Cost-based Database Optimizers*.

SELECTED AWARDS

UCLA Dissertation Fellowship. 2018-2019

Google Research & Travel Support Archimedes Program. 2018

NSF Travel Grants. 2016, 2017, 2018

Research Grant of the National University Student Innovation Program. Ministry of Education of China. 2014

Tung OOCL Scholarships. Tung's Foundation of Hong Kong & The Oriental Overseas Container Line. 2012, 2013

Wang-Dao Fellowship. President of Fudan University. 2013

EMC Scholarship. EMC Inc. 2013

Chun-Tsung Fellowship. Hui-Chun Chin and Tsung-Dao Lee Chinese Undergraduate Research Endowment. 2012