Muhao Chen

Assistant Professor of Computer Science, UC Davis.
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RESEARCH INTERESTS

Natural Language Processing; Robustness, Generalizability, and Indirect Supervision in Machine Learning; Knowledge Acquisition from Unstructured Data; Knowledge-driven AI for Interdisciplinary Tasks (Computational Biology, Medicine, and Geoinformatics).

EDUCATION AND ACADEMIC EXPERIENCE

University of California, Davis, CA

2023.11-present

- ***Assistant Professor (step 4)***, Department of Computer Science

University of Southern California, Los Angeles, CA

- ***Adjunct Assistant Research Professor***, Department of Computer Science *2023.11-present*
- ***Assistant Research Professor***, Department of Computer Science *2020.9-2023.10*

University of Pennsylvania, Philadelphia, PA

2019.7-2020.8

Postdoctoral Fellow, *Hosted by Dan Roth, Eduardo D. Glandt Distinguished Professor of Computer and Information Science*

University of California, Los Angeles, CA

Ph.D. in Computer Science *2014.9-2019.6*
Dissertation: Multi-relational Representation Learning and Knowledge Acquisition
Advisors:

- Carlo Zaniolo, *Distinguished Professor of Computer Science, N.E. Friedmann Chair in Knowledge Science* (Committee Chair)
- Kai-Wei Chang, *Associate Professor of Computer Science*
- Wei Wang, *Leonard Kleinrock Chair Professor of Computer Science*

Fudan University, Shanghai, China

B.S. in Computer Science. *Advisor:* X. Sean Wang, *Dorothean Chair Professor of Computer Science* *2010.9-2014.6*

PUBLICATION

*Indicating equal contributions. ✉Indicating corresponding authors of journal publications.

Tutorials

T1 **Muhao Chen**, Chaowei Xiao, Huan Sun, Lei Li, Leon Derczynski, Anima Anandkumar. Combating Security and Privacy Issues in the Era of Large Language Models. In **NAACL**, 2024.

T2 Wenpeng Yin, **Muhao Chen**, Rui Zhang, Ben Zhou, Fei Wang, Dan Roth. Enhancing LLM Capabilities Beyond Scaling Up. In **EMNLP**, 2024.

T3 Wenpeng Yin, **Muhao Chen**, Ben Zhou, Qiang Ning, Kai-Wei Chang, Dan Roth. Indirectly Supervised Natural Language Processing. In **ACL**, 2023.

T4 **Muhao Chen**, Lifu Huang, Manling Li, Ben Zhou, Heng Ji, Dan Roth. New Frontiers of Information Extraction. In **NAACL**, 2022.

T5 **Muhao Chen**, Hongming Zhang, Qiang Ning, Manling Li, Heng Ji, Kathleen McKeown, Dan Roth. Event-centric Natural Language Processing. In **ACL**, 2021.

T6 **Muhao Chen**, Hongming Zhang, Qiang Ning, Manling Li, Heng Ji, Dan Roth. Event-centric Natural Language Understanding. In **AAAI**, 2021.

T7 Jay Pujara, Pedro Szekely, Huan Sun, **Muhao Chen**. From Tables to Knowledge: Recent Advances in Table Understanding. In **KDD**, 2021.

T8 **Muhao Chen**, Kai-Wei Chang, Dan Roth. Recent Advances in Transferable Representation Learning. In **AAAI**, 2020.

Refereed Publication in Conference Proceedings

P1 James Y. Huang, Wenlin Yao, Kaiqiang Song, Hongming Zhang, **Muhao Chen**, Dong Yu. Bridging Continuous and Discrete Spaces: Interpretable Sentence Representation Learning via Compositional Operations. In In *the 38th Conference on Empirical Methods in Natural Language Processing* (**EMNLP**), 2023.

P2 Haoyu Wang, Hongming Zhang, Yueguan Wang, Yuqian Deng, **Muhao Chen**, Dan Roth. Are All Steps Equally Important? Benchmarking Essentiality Detection of Events. In *the 38th Conference on Empirical Methods in Natural Language Processing* (**EMNLP**), 2023.

P3 Zekun Li, Wenxuan Zhou, Yao-Yi Chiang, **Muhao Chen**. GeoLM: Empowering Language Models for Geospatially Grounded Language Understanding. In *the 38th Conference on Empirical Methods in Natural Language Processing* (**EMNLP**), 2023.

P4 Yiwei Wang, Yujun Cai, **Muhao Chen**, Yuxuan Liang, Bryan Hooi. Primacy Effect of ChatGPT. In *the 38th Conference on Empirical Methods in Natural Language Processing* (**EMNLP**), 2023.

P5 Fei Wang, Wenjie Mo, Yiwei Wang, Wenxuan Zhou, **Muhao Chen**. A Causal View of Entity Bias in (Large) Language ModelsA Causal View of Entity Bias in (Large) Language Models. In *the 38th Conference on Empirical Methods in Natural Language Processing* (**EMNLP**) - Findings, 2023.

P6 Wenxuan Zhou, Sheng Zhang, Hoifung Poon, **Muhao Chen**. Context-faithful Prompting for Large Language Models. In In *the 38th Conference on Empirical Methods in Natural Language Processing* (**EMNLP**) - Findings, 2023.

P7 Nan Xu, Fei Wang, Mingtao Dong, **Muhao Chen**. Dense Retrieval as Indirect Supervision for Large-space Decision Making. In *the 38th Conference on Empirical Methods in Natural Language Processing* (**EMNLP**) - Findings, 2023.

P8 Tenghao Huang, Ehsan Qasemi, Bangzheng Li, He Wang, Faeze Brahman, **Muhao Chen**, Snigdha Chaturvedi. Affective and Dynamic Beam Search for Story Generation. In *the 38th Conference on Empirical Methods in Natural Language Processing* (**EMNLP**) - Findings, 2023.

P9 Shikhar Singh, Ehsan Qasemi, **Muhao Chen**. VIPHY: Probing "Visible" Physical Commonsense Knowledge. In *the 38th Conference on Empirical Methods in Natural Language Processing* (**EMNLP**) - Findings, 2023.

P10 Yiwei Wang, Bryan Hooi, Fei Wang, Yujun Cai, Yuxuan Liang, Wenxuan Zhou, Jing Tang, Manjuan Duan, **Muhao Chen**. How Fragile is Relation Extraction under Entity Replacements? In *the 27th SIGNLL Conference on Computational Natural Language Learning* (**CoNLL**), 2023.

P11 Wenxuan Zhou, Sheng Zhang, Tristan Naumann, **Muhao Chen**, Hoifung Poon. Continual Contrastive Finetuning Improves Low-Resource Relation Extraction. In *the 61st Annual Meeting of the Association for Computational Linguistics* (**ACL**), 2023.

P12 Jiashu Xu, Mingyu Derek Ma, **Muhao Chen**. Can NLI Provide Proper Indirect Supervision for Low-resource Biomedical Relation Extraction? In *the 61st Annual Meeting of the Association for Computational Linguistics* (**ACL**), 2023.

P13 Tanay Dixit, Fei Wang, **Muhao Chen**. Improving Factuality of Abstractive Summarization without Sacrificing Summary Quality. In *the 61st Annual Meeting of the Association for Computational Linguistics* (**ACL**), 2023.

P14 Shudi Hou, Yu Xia, **Muhao Chen**, Sujian Li. Contrastive Bootstrapping for Label Refinement. In *the 61st Annual Meeting of the Association for Computational Linguistics* (**ACL**), 2023.

P15 Fei Wang*, James Y. Huang*, Tianyi Yan, Wenxuan Zhou, **Muhao Chen**. Robust Natural Language Understanding with Residual Attention Debiasing. In *the 61st Annual Meeting of the Association for Computational Linguistics* (**ACL**) - Findings, 2023.

P16 Keming Lu, I-Hung Hsu, Wenxuan Zhou, Mingyu Derek Ma, **Muhao Chen**. Multi-hop Evidence Retrieval for Cross-document Relation Extraction. In *the 61st Annual Meeting of the Association for Computational Linguistics* (**ACL**) - Findings, 2023.

P17 Xinze Li, Yixin Cao, **Muhao Chen**, Aixin Sun. Take a Break in the Middle: Investigating Subgoals towards Hierarchical Script Generation. In *the 61st Annual Meeting of the Association for Computational Linguistics* (**ACL**) - Findings, 2023.

P18 Haoyu Wang, Hongming Zhang, Yuqian Deng, Jacob Gardner, Dan Roth, **Muhao Chen**. Extracting or Guessing? Improving Faithfulness of Event Temporal Relation Extraction. In *the 17th Conference of the European Chapter of the Association for Computational Linguistics* (**EACL**), 2023.

P19 Xiaocong Yang, James Y. Huang, Wenxuan Zhou, **Muhao Chen**. Parameter-Efficient Tuning with Special Token Adaptation. In *the 17th Conference of the European Chapter of the Association for Computational Linguistics* (**EACL**), 2023.

P20 Bonan Kou, **Muhao Chen**, Tianyi Zhang. Automated Summarization of Stack Overflow Posts. In the *Proceedings of the 45th IEEE/ACM International Conference on Software Engineering* (**ICSE**), 2023.

P21 Zhongkai Zhao, Bonan Kou, Mohamed Yilmaz Ibrahim, **Muhao Chen**, Tianyi Zhang. Knowledge-based Version Incompatibility Detection for Deep Learning. In the *31st ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering* (**ESEC/FSE**), 2023.

P22 Tai Nguyen, Yifeng Di, Joohan Lee, **Muhao Chen**, Tianyi Zhang. Software Entity Recognition with Noise-Robust Learning. *In the Proceedings of the 38th IEEE/ACM International Conference on Automated Software Engineering* (**ASE**), 2023.

P23 Peifeng Wang, Aaron Chan, Filip Ilievski, **Muhao Chen**, Xiang Ren. PINTO: Faithful Language Reasoning Using Prompted-Generated Rationales. In *the 11th International Conference on Learning Representations* (**ICLR**), 2023.

P24 Wenxuan Zhou, Fangyu Liu, Huan Zhang, **Muhao Chen**. Sharpness-Aware Minimization with Dynamic Reweighting. In *the 37th Conference on Empirical Methods in Natural Language Processing* (**EMNLP**), 2022.

P25 Nan Xu, Fei Wang, Bangzheng Li, Mingtao Dong, **Muhao Chen**. Does Your Model Classify Entities Reasonably? Diagnosing and Mitigating Spurious Correlations in Entity Typing. In *the 37th Conference on Empirical Methods in Natural Language Processing* (**EMNLP**), 2022.

P26 Fei Wang, Kaiqiang Song, Hongming Zhang, Lifeng Jin, Sangwoo Cho, Wenlin Yao, Xiaoyang Wang, **Muhao Chen**, Dong Yu. Salience Allocation as Guidance for Abstractive Summarization. In *the 37th Conference on Empirical Methods in Natural Language Processing* (**EMNLP**), 2022.

P27 Keming Lu, I-Hung Hsu, Wenxuan Zhou, Mingyu Derek Ma, **Muhao Chen**. Summarization as Indirect Supervision for Relation Extraction. In *the 37th Conference on Empirical Methods in Natural Language Processing* (**EMNLP**) - Findings, 2022.

P28 Zekun Li, Jina Kim, Yao-Yi Chiang, **Muhao Chen**. SpaBERT: Pretrained Language Models on Geographic Data for Geo-Entity Representation. In *the 37th Conference on Empirical Methods in Natural Language Processing* (**EMNLP**) - Findings, 2022.

P29 Ehsan Qasemi, Filip Iievski, **Muhao Chen**, Pedro Szekely. PaCo: Preconditions Attributed to Commonsense Knowledge. In *the 37th Conference on Empirical Methods in Natural Language Processing* (**EMNLP**) - Findings, 2022.

P30 Yiwei Wang, **Muhao Chen**, Wenxuan Zhou, Yujun Cai, Yuxuan Liang, Dayiheng Liu, Baosong Yang, Juncheng Liu, Bryan Hooi. Should We Rely on Entity Mentions for Relation Extraction? Debiasing Relation Extraction with Counterfactual Analysis. In *the 20th Annual Conference of the North American Chapter of the Association for Computational Linguistics* (**NAACL**), 2022.

P31 Fei Wang, Zhewei Xu, Pedro Szekely, **Muhao Chen**. Robust (Controlled) Table-to-Text Generation with Structure-Aware Equivariance Learning. In *the 20th Annual Conference of the North American Chapter of the Association for Computational Linguistics* (**NAACL**), 2022.

P32 James Y. Huang, Bangzheng Li, Jiashu Xu, **Muhao Chen**. Unified Semantic Typing with Meaningful Label Inference. In *the 20th Annual Conference of the North American Chapter of the Association for Computational Linguistics* (**NAACL**), 2022.

P33 Wenxuan Zhou, Qiang Ning, Heba Elfardy, Kevin Small, **Muhao Chen**. Answer Consolidation: Formulation and Benchmarking. In *the 20th Annual Conference of the North American Chapter of the Association for Computational Linguistics* (**NAACL**), 2022.

P34 Juncheng Liu, Zequn Sun, Bryan Hooi, Yiwei Wang, Dayiheng Liu, Baosong Yang, Xiaokui Xiao, **Muhao Chen**. Dangling-Aware Entity Alignment with Mixed High-Order Proximities. *In the 20th Annual Conference of the North American Chapter of the Association for Computational Linguistics* (**NAACL**) - Findings, 2022.

P35 Yiwei Wang, **Muhao Chen**, Wenxuan Zhou, Yujun Cai, Yuxuan Liang, Bryan Hooi. GraphCache: Message Passing as Caching for Sentence-Level Relation Extraction. In *the 20th Annual Conference of the North American Chapter of the Association for Computational Linguistics* (**NAACL**) - Findings, 2022.

P36 Wenxuan Zhou*, Fangyu Liu*, Ivan Vulić, Nigel Collier, **Muhao Chen**. Prix-LM: Pretraining for Multilingual Knowledge Base Construction. In *Proceedings of the 60th Annual Meeting of the Association for Computational Linguistics* (**ACL**), 2022.

P37 Peifeng Wang, Jonathan Zamora, Junfeng Liu, Filip Ilievski, **Muhao Chen**, Xiang Ren. Contextualized Scene Imagination for Generative Commonsense Reasoning. In *the 10th International Conference on Learning Representations* (**ICLR**), 2022.

P38 Wenxuan Zhou, **Muhao Chen**. An Improved Baseline for Sentence-level Relation Extraction. In *the 2nd Conference of the Asia-Pacific Chapter of the Association for Computational Linguistics* (**AACL**), 2022.

P39 Ehsan Qasemi, Piyush Khanna, Qiang Ning, **Muhao Chen**. PInKS: Preconditioned Commonsense Inference with Minimal Supervision. In *the 2nd Conference of the Asia-Pacific Chapter of the Association for Computational Linguistics* (**AACL**), 2022.

P40 Jihoon Sohn, Mingyu Derek Ma, **Muhao Chen**. Bending the Future: Autoregressive Modeling of Temporal Knowledge Graphs in Curvature-Variable Hyperbolic Spaces. In *the 4th Conference on Automated Knowledge Base Construction* (**AKBC**), 2022.

P41 Bonan Kou, Yifeng Di, **Muhao Chen**, Tianyi Zhang. SOSum: A Dataset of Stack Overflow Post Summaries. In *Proceedings of the 19th International Conference on Mining Software Repositories* (**MSR**), 2022. (Data/Tool Showcase Track)

P42 Wenxuan Zhou, Fangyu Liu, **Muhao Chen**. Contrastive Out-of-Distribution Detection for Pretrained Transformers. In *Proceedings of the 36th Conference on Empirical Methods in Natural Language Processing* (**EMNLP**), 2021.

P43 Wenxuan Zhou, **Muhao Chen**. Learning from Noisy Labels for Entity-Centric Information Extraction. In *Proceedings of the 36th Conference on Empirical Methods in Natural Language Processing* (**EMNLP**), 2021.

P44 Haoyu Wang, Hongming Zhang, **Muhao Chen**, Dan Roth. Learning Constraints and Descriptive Segmentation for Subevent Detection. In *Proceedings of the 36th Conference on Empirical Methods in Natural Language Processing* (**EMNLP**), 2021.

P45 Xiyang Zhang, **Muhao Chen**, Jonathan May. Salience-Aware Event Chain Modeling for Narrative Understanding. In *Proceedings of the 36th Conference on Empirical Methods in Natural Language Processing* (**EMNLP**), 2021.

P46 Fei Wang, Kexuan Sun, Jay Pujara, Pedro Szekely, **Muhao Chen**. Table-based Fact Verification With Salience-aware Learning. In *the 36th Conference on Empirical Methods in Natural Language Processing* (**EMNLP**) - Findings, 2021.

P47 Mingyu Derek Ma, **Muhao Chen**, Te-lin Wu, Nanyun Peng. HyperExpan: Taxonomy Expansion with Hyperbolic Representation Learning. In *the 36th Conference on Empirical Methods in Natural Language Processing* (**EMNLP**) - Findings, 2021.

P48 Fangyu Liu, **Muhao Chen**, Dan Roth, Nigel Collier. Visual Pivoting for (Unsupervised) Entity Alignment. In *the 35th AAAI Conference on Artificial Intelligence* (**AAAI**), 2021.

P49 Cunchao Zhu, **Muhao Chen**, Changjun Fan, Guangquan Cheng, Yan Zhang. Learning from History: Modeling Temporal Knowledge Graphs with Sequential Copy-Generator Networks. In *the 35th AAAI Conference on Artificial Intelligence* (**AAAI**), 2021.

P50 Zequn Sun, **Muhao Chen**, Wei Hu. Knowing the No-match: Entity Alignment with Dangling Cases. In *Proceedings of the 59th Annual Meeting of the Association for Computational Linguistics* (**ACL**), 2021.

P51 Peifeng Wang, Filip Ilievski, Muhao Chen, Xiang Ren. Do Language Models Perform Generalizable Commonsense Inference? In *Proceedings of the 59th Annual Meeting of the Association for Computational Linguistics* (**ACL**) - *Findings*, 2021.

P52 **Muhao Chen**, Weijia Shi, Ben Zhou, Dan Roth. Cross-lingual Entity Alignment with Incidental Supervision. In *the 16th Conference of the European Chapter of the Association for Computational Linguistics* (**EACL**), 2021.

P53 Xuelu Chen*, Michael Boratko*, **Muhao Chen**, Shib Sankar Dasgupta, Xiang Li, Andrew McCallum. Probabilistic Box Embeddings for Uncertain Knowledge Graph Reasoning. In *the 19th Annual Conference of the North American Chapter of the Association for Computational Linguistics* (**NAACL**), 2021.

P54 Fei Wang, Kexuan Sun, **Muhao Chen**, Jay Pujara, Pedro Szekely. Retrieving Complex Tables with Multi-Granular Graph Representation Learning. In *Proceedings of the 44th ACM SIGIR Conference on Research and Development in Information Retrieval* (**SIGIR**), 2021.

P55 Minh Pham, Craig Knoblock, **Muhao Chen**, Binh Vu, Jay Pujara. SPADE: A Semi-supervised Probabilistic Approach for Detecting Errors in Tables. In *Proceedings of the 30th International Joint Conference on Artificial Intelligence* (**IJCAI**), 2021.

P56 Kexuan Sun, Fei Wang, **Muhao Chen**, Jay Pujara. Tabular Functional Block Detection with Embedding-based Agglomerative Cell Clustering. In *Proceedings of the 30th ACM International Conference on Information and Knowledge Management* (**CIKM**), 2021.

P57 **Muhao Chen**, Hongming Zhang, Haoyu Wang, Dan Roth. "What Are You Trying to Do?" Semantic Typing of Event Processes. In *Proceedings of the 24th SIGNLL Conference on Computational Natural Language Learning* (**CoNLL**)**,** 2020. **Best Paper Nomination**

P58 Zequn Sun, **Muhao Chen**, Wei Hu, Chengming Wang. Knowledge Association with Hyperbolic Representation Learning of Knowledge Graphs. In *Proceedings of the 25th Conference on Empirical Methods in Natural Language Processing* (**EMNLP**) 2020.

P59 Haoyu Wang, **Muhao Chen**, Hongming Zhang, Dan Roth. Joint Constrained Learning for Event-Event Relation Extraction. In *Proceedings of the 25th Conference on Empirical Methods in Natural Language Processing* (**EMNLP**), 2020.

P60 Hongming Zhang, **Muhao Chen**, Haoyu Wang, Y. Song, Dan Roth. Analogous Process Structure Induction for Sub-event Sequence Prediction. In *Proceedings of the 25th Conference on Empirical Methods in Natural Language Processing* (**EMNLP**), 2020.

P61 Xuelu Chen, **Muhao Chen**, Changjun Fan, Ankith Uppunda, Yizhou Sun, Carlo Zaniolo. Multilingual Knowledge Graph Completion via Ensemble Knowledge Transfer. In *Proceedings of the 25th Conference on Empirical Methods in Natural Language Processing* (**EMNLP**) - *Findings*, 2020.

P62 Zequn Sun, Chengming Wang, Wei Hu, **Muhao Chen**, Jian Dai, Wei Zhang, Yuzhong Qu. Knowledge Graph Alignment Network with Gated Multi-hop Neighborhood Aggregation. In *the 34th AAAI Conference on Artificial Intelligence* (**AAAI**), 2020.

P63 Changping Meng, **Muhao Chen**, Jie Mao, Jennifer Neville. ReadNet: A Hierarchical Transformer Framework for Readability Analysis. In *the 42nd European Conference on Information Retrieval* (**ECIR**), 2020.

P64 Junheng Hao, Chelsea J. T. Ju, **Muhao Chen**, Yizhou Sun, Carlo Zaniolo, Wei Wang. Bio-JOIE: Joint Representation Learning of Biological Knowledge Bases. In *the 11th ACM SIGBio Conference on Bioinform., Comput. Bio. and Health Inform.* (**ACM-BCB**), 2020 (**SIGBio Best Student Paper Award**, ~0.8%)

P65 Tianran Zhang, **Muhao Chen**, Alex Bui. Diagnostic Prediction with Sequence-of-sets Representation Learning for Clinical Events. In *Proceedings of the 18th International Conference on Artificial Intelligence in Medicine* (**AIME**), 2020

P66 **Muhao Chen**, Yingtao Tian, Haochen Chen, Kai-Wei Chang, Steve Skiena, Carlo Zaniolo. Learning to Represent Bilingual Dictionaries. In *Proceedings of the 23rd SIGNLL Conference on Computational Natural Language Learning* (**CoNLL**), 2019

P67 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.

P68 Xuelu Chen, **Muhao Chen**, Weijia Shi, Yizhou Sun, Carlo Zaniolo. Uncertain Knowledge Graphs Embeddings. In *the 33rd International Conference on Artificial Intelligence* (**AAAI**), 2019.

P69 **Muhao Chen**[*], Weijia Shi[*], Pei Zhou , Kai-Wei Chang. Retrofitting Contextualized Word Embeddings with Paraphrases. In *Proceedings of the 24th Conference on Empirical Methods in Natural Language Processing* (**EMNLP**), 2019.

P70 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 *Proceedings of the 24th Conference on Empirical Methods in Natural Language Processing* (**EMNLP**), 2019.

P71 **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.

P72 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. Also in **ISWC** 2020 Invited Sister Conference Track.

P73 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.

P74 Haochen Chen, Syed Fahad Sultan, Yingtao Tian, **Muhao Chen**, Steven Skiena. Fast and Accurate Network Embeddings via Very Sparse Random Projection. In *Proceedings of the 28th ACM International Conference on Information and Knowledge Management* (**CIKM**), 2019.

P75 Changjun Fan, Yuhui Ding, Li Zeng, **Muhao Chen**, Yizhou Sun and Zhong Liu. Learning to Identify High Betweenness Centrality Nodes from Scratch: A Novel Graph Neural Network Approach. In *Proceedings of the 28th ACM International Conference on Information and Knowledge Management* (**CIKM**), 2019.

P76 **Muhao Chen**, Changping Meng, Gang Huang, Carlo Zaniolo. Learning to Differentiate Between Main-articles and Sub-articles in Wikipedia. In IEEE International Conference on Big Data (**BigData**), 2019.

P77 Yingtao Tian, Haochen Chen, Bryan Perozzi, **Muhao Chen**, Xiaofei Sun, Steven Skiena. Social Relation Inference via Label Propagation. In *the 41st European Conference on Information Retrieval* (**ECIR**), 2019.

P78 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.

P79 **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)

P80 **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.

P81 **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

P82 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.

P83 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.

P84 **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.

P85 **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.

P86 **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.

Refereed Journal Publication and Book Chapters

J1 Bangzheng Li, Wenpeng Yin, **Muhao Chen**. Ultra-fine Entity Typing with Indirect Supervision from Natural Language Inference. *Transactions of the Association for Computational Linguistics* (**TACL**). MIT Press, 2022.

J2 Tianran Zhang, **Muhao Chen**, Alex Bui. AdaDiag: Adversarial Domain Adaptation of Diagnostic Prediction with Clinical Event Sequences. *Journal of Biomedical Informatics* (**JBI**), vol. 134. Elsevier, 2022.

J3 Mohammad Rostami, Hangfeng He, **Muhao Chen**, Dan Roth. Transfer Learning via Representation Learning. *Federated and Transfer Learning.* Springer, 2022 (Book Chapter)

J4 Jyun-Yu Jiang, Chelsea J.-T. Ju, Junheng Hao, **Muhao Chen**, Wei Wang. Circular RNA Prediction based on Junction Encoders and Deep Interaction among Splice Sites. **Bioinformatics**, vol. 37. Oxford University Press, 2021. Full Paper of **ISMB/ECCB**, 2021.

J5 Guangyu Zhou*, **Muhao Chen***, Chelsea J. T. Ju*, Zheng Wang, Jyun-Yu Jiang, Wei Wang. Mutation effect estimation on protein-protein interactions using deep contextualized representation learning. **NAR Genom. Bioinform**, vol. 2 (2). Oxford University Press. 2020.

J6 Zequn Sun, Qingheng Zhang, Wei Hu, Chengming Wang, **Muhao Chen**, Chengkai Li, Yuzhong Qu. A Benchmarking Study of Embedding-based Entity Alignment for Knowledge Graphs. *Proceedings of the VLDB Endowment* (**PVLDB**), vol. 13. ACM. 2020

J7 **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**, vol. 35 (14) Oxford University Press. Full Paper of **ISMB/ECCB**, 2019.

J8 Carlo Zaniolo, Shi Gao, Maurizio Atzori, **Muhao Chen**, Jiaqi Gu. User-Friendly Temporal Queries on Historical Knowledge Bases. **Information and Computation**, Vol. 259 (3). Elsevier, 2018.

Refereed Workshop and System Demonstration Papers

W1 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.

W2 Zhubo Deng, Pei Zhou, Weijia Shi, **Muhao Chen**, Kai-Wei Chang. Computational Analysis of French-origin Reborrowing Process for English Loanwords. In *ICDM Workshop on Multilingual Cognitive Services* (**ICDMW**), 2019

W3 Changjun Fan, Yizhou Sun, Li Zeng, Yang-Yu Liu, **Muhao Chen**, Zhong Liu. Dismantle Large Networks through Deep Reinforcement Learning. In *ICLR Workshops*, 2019.

W4 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.

W5 **Muhao Chen**, Tao Zhou, Pei Zhou, Carlo Zaniolo. Multi-graph Affinity Embeddings for Multilingual Knowledge Graphs. **Contributed talk** in the *6th Workshop on Automated Knowledge Base Construction at NIPS* (**AKBC**). 2017.

W6 **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)

W7 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.

W8 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).

AWARDS

- *Amazon Research Award*. 2023
- *Keston Exploratory Research Award*. 2023
- *Amazon Research Award*. 2022
- *Cisco Faculty Research Award*. 2022
- *NSF CISE Research Initiation Initiative (CRII) Award.* 2021
- *ACM SIGBio Best Student Paper Award.* 2020
- *UCLA Dissertation Fellowship.* 2018-2019
- *Tung OOCL Scholarships.* Tung's Foundation of Hong Kong & The Oriental Overseas Container Line. 2012, 2013
- *Wang-Dao Fellowship.* President of Fudan University. 2013
- *Chun-Tsung Fellowship.* Hui-Chun Chin and Tsung-Dao Lee Chinese Undergraduate Research Endowment. 2012

FUNDING

Amazon Research Award: ***Robust (Controlled) NLG with Structure-Aware Equivariance Learning*** 2023-2024
- $70K unrestricted fund + $40K AWS credits. Spring 2023 call. (Sole PI)

NSF Proto-OKN: ***Knowledge Graph Construction for Resilient, Trustworthy, and Secure Software Supply Chains*** 2023-2026
- NSF ITE Grant, $375K my share. (Co-PI)

Amazon Research Award: ***On Faithfulness of Information Extraction*** 2023-2024
- $73.8K unrestricted fund + $20K AWS credits. Spring 2022 call. (Sole PI)

Keston Exploratory Research Award: ***Multi-document Newsworthy Event Monitoring and Forecasting*** 2023-2024
- $100K unrestricted fund from Keston Family Foundation. (PI; w/ Jonathan May)

Cisco Research Award: ***Robust Knowledge Extraction from Text***. 2022-2023
- $70.4K unrestricted fund. (Sole PI)

DARPA KMASS Phase 1: ***Knowledge Needed in Context.*** 2022-2023
- $308K my share. (Co-PI)

NSF Cloud Access Grant. 2022-2023
- $80K cloud computing credits. (Sole PI)

Improved Performance, Analytics and Summarization of Synergistic Anticipation of Geopolitical Events**.** 2022-2023
- ARLIS INFER research grant. $50K my share. (Co-PI)

NSF CRII: III: ***Knowledge Graph Completion with Transferable Representation Learning***. 2021-2023
- NSF IIS Grant, $175K. (Sole PI)

DARPA MCS: ***Multi-modal Open World Grounded Learning and Inference***. 2020-2023
- $600K my share. (Senior Personnel)

TEACHING AND MENTORING

Teaching

Instructor
- CSCI 544: Applied Natural Language Processing (Graduate-level course; Enrollment: 307) Spring 2022

Teaching assistant (2015.9-2016.6), associate (2016.9-2017.6), fellow (2017.9-2018.6) at UCLA
- Data Structures and Algorithms; Introduction to Computer Science.

Lab Members/Students

Fei Wang, Ph.D. Student in Computer Science. Fall 2022-date
- Viterbi Honors Program; **USC CS Departmental Best Research Award**; **Annenberg Fellow**. **Amazon ML Fellowship**.
- Joined the lab as a M.S. student in Fall 2020

Bangzheng Li, Ph.D. Student in Computer Science. Fall 2022-date
- **Provost PhD Fellow**.
- Joined the lab as an undergraduate researcher in Summer 2021

Qin (Jacqueline) Liu, Ph.D. Student in Computer Science. (USC PhD Fellowship) Fall 2022-date
Tenghao Huang, Ph.D. Student in Computer Science (Viterbi-ISI Fellow) Fall 2022-date
Nan (Nancy) Xu, Ph.D. Student in Computer Science Spring 2022-date
James Y. Huang. PhD Student in Computer Science. Fall 2021-date
Eric (Ehsan) Qasemi, PhD Student in Computer Science. (Co-advised with Pedro Szekely) Fall 2020-date
Wenxuan Zhou, PhD Student in Computer Science. Fall 2020-date
Keming (Luke) Lu, MS Student in Industrial and System Engineering. Fall 2021-date
Shikhar Singh, MS Student in Computer Science. Fall 2021-Summer 2022
Tianyi (Lorena) Yan, Undergraduate Student, Computer Science (CURVE Fellowship) Fall 2022-date
Jacky Mo, Undergraduate Student, Computer Science (CURVE Fellowship) Fall 2022-date
Mingtao Dong, Undergraduate Student, Computer Science (Provost's Research Fellowship) Spring 2022-date
Jiashu Xu, Undergraduate Student, Computer Science (CURVE Fellowship) Fall 2021- Spring 2022
Zhewei Xu, Undergraduate Student, Computer Science (CURVE Fellowship) Fall 2021-Spring 2022

Logan Norman, Undergraduate Student, Computer Science (Viterbi Fellowship) Fall 2021-Spring 2022

Visiting Scholars/Students

Tianqing Fang. PhD Student in Computer Science, HKUST (Hong Kong PhD Fellow) Summer 2022-Spring 2023
Xiaocong Yang. Undergraduate, Tsinghua University. (Joined UIUC as a Master Student) Summer-Fall 2022
Amani Rune Maina-Kilaas. Undergraduate, Harvey Mudd College (NSF REU Student; Joined MIT as a PhD Student) Summer 2022
Tanay Dixit. Undergraduate, IIT Madras, Computer Science (NSF REU Student; Joined UIUC as a Master Student) Summer 2022
Devadutta Dash. Undergraduate, IIT Varanasi, Computer Science (IUSSFT-Viterbi Research Intern) Summer 2022
Jihoon Sohn. USC PhD Student in Mathematics Spring 2021-Spring 2022
Bangzheng Li. UIUC, B.S. in Computer Science (Now PhD student in my lab) Summer 2021-Fall 2021
Shanxiu He. Undergraduate, UCLA Computer Science (USC ISI NLP Intern; Joined UCSB as a PhD Student) Summer 2021
Piyush Khanna, Undergraduate, Delhi Tech Univ., Computer Science (Joined UCSD as a Master Student) Summer 2021
Yueguan Wang. Undergraduate, Tsinghua Univ., EE (USC-THU Summer Research Program) Summer 2021

Dissertation/Qualification Committee

I-Hung Hsu, USC PhD Student in Computer Science. (Qualification Committee)
Haowen Lin, USC PhD Student in Computer Science. (Qualification Committee)
Jianzhi Yang, USC PhD Student in Quantitative and Computational Biology. (Qualification Committee)
Tejas Srinivasan, USC PhD Student in Computer Science. (Qualification Committee)
Binh Vu, USC PhD Student in Computer Science. (Qualification Committee)
Yizhou Zhang, USC PhD Student in Computer Science. (Qualification Committee)
Jihoon Sohn, USC PhD in Mathematics, 2022. (Dissertation Committee)
Tianran Zhang, UCLA PhD in Bioengineering, 2022. (Dissertation Committee)
Michiel de Jong, USC PhD Student in Computer Science. (Qualification Committee)
Minh Pham, USC PhD in Computer Science, 2022. (Dissertation/Qualification Committee)
Kexuan Sun, USC PhD Student in Computer Science. (Qualification Committee)
Xuelu (Shirley) Chen, UCLA PhD in Computer Science, 2021. (Dissertation Committee)
Jeong Hyun An, USC M.S. in Computer Science, 2022. (Dissertation Committee Chair)

Mentoring (Before USC)

Haoyu Wang, UPenn MS Student in CIS (Now PhD student at UPenn). **Research mentor** Fall 2019-Spring 2022
Tianran Zhang, UCLA PhD student in Bioengineering. **Research mentor** Fall 2019-Winter 2021
Junheng Hao, UCLA PhD student in Computer Science. **Research mentor** Fall 2017-Fall 2019
Xuelu (Shirley) Chen, UCLA PhD student in Computer Science. **Research mentor** Fall 2017-Winter 2020
Pei Zhou, UCLA undergraduate student (Now PhD student at USC CS). **Research mentor** Winter 2017-Spring 2019
Weijia Shi, UCLA undergraduate student (Now PhD student at UW CSE). **Research mentor** Summer 2018-Spring 2019
Ankith Uppunda. UCLA undergraduate student. **Research mentor**. Spring 2019
Zhubo Deng, UCLA undergraduate student. **Research mentor**. . Spring 2019
Xiaoshuang Wei, UCLA MS student in Computer Science (Now software engineer at Google). **Thesis mentor** Spring 2017

PROFESSIONAL SERVICE

Panelist:

2021, 2022: NSF CISE Core Panel

Conference Organization/Senior Committee Member:

2023: AAAI (**Area Chair**), AACL (**Senior Area Chair** – Information Retrieval and Text Mining), ACL (**Area Chair** – Information Extraction), EMNLP (**Area Chair** – Information Extraction), NLPCC (Area Chair)
2022: AAAI (Senior PC), NAACL (**Senior Area Chair** – Information Extraction), NAACL SRW (Faculty Mentor), EMNLP (**Area Chair** – Commonsense Reasoning), AACL (**Area Chair** – Information Retrieval and Text Mining)
2021: AAAI (Senior PC), IJCAI (Senior PC)
2019: IEEE AIKE (Doctoral Consortium Chair)

Workshop Organization Member:

Indirect, Weak and Self Supervision for Knowledge Extraction (Wise-Supervision@AKBC), 2022

Deep Learning on Graphs for Natural Language Processing (DLG4NLP@NAACL), 2022

PC Member:

2021: ACL, EACL, NAACL, WSDM, WWW.
2020: AAAI, AACL-IJCNLP, AKBC, COLING, EMNLP, IJCAI, ISWC, KDD, SIGIR, WSDM, *SEM.
2019: AAAI, AKBC, NAACL, ACL, EMNLP-IJCNLP, BigData, NLPCC, WISE, ICSC.
2018: AAAI, EMNLP, BigData, NLPCC, SoCal NLP.

Editorial Board: Frontiers in Big Data

Journal Reviewer: TPAMI, TACL, TNNLS, TASLP, Pattern Recognition, Bioinformatics, PLOS Computational Biology, Briefings in Bioinformatics, Cell Systems, Clinical and Translational Medicine, Comput. & Struct. Biotechnol., TKDD, TOIS, W3J, TKDE, TII, BMC Genomics, BMC Medical Genomics, BMC Human Genetics, Human Genomics, Quantitative Biology, GeoInformatica, Information Sciences, Nature Machine Intelligence.

University Service

NSF REU Site, **Co-organizer**	2022, 2023
USC ISI Institutional AI Seminar, **Organizer**	2021.7-date
Department of Computer Science, **Faculty Hiring Committee**	2021, 2022
Viterbi School of Engineering, **Fellowship Committee**	2021
Department of Computer Science, **PhD Admission Fellowship Committee**	2021

PRESENTATIONS

Invited talks, colloquia and tutorials

1. Indirectly Supervised Natural Language Processing. *Half-day Tutorial at ACL*. July, 2023.
2. Robust and Indirectly Supervised Knowledge Acquisition. *CS Research Colloquium, ASU*. March 2023
3. Robust and Indirectly Supervised Knowledge Acquisition. *CS Research Colloquium, UMN*. March 2023
4. Robust and Indirectly Supervised Knowledge Acquisition. *CS Research Colloquium, UC Davis*. Feb 2023
5. Robust and Indirectly Supervised Knowledge Acquisition. *CS Research Colloquium, UCSB*. Feb 2023
6. Robust and Indirectly Supervised Information Extraction. *Invited talk, AI & ML Seminar, UCI*. Nov 2022
7. Robust and Indirectly Supervised Information Extraction. *Invited talk, NL Seminar, UMN*. Nov 2022
8. Robust and Indirectly Supervised Information Extraction. *Invited talk, CS Department Seminar (CS201), UCLA*. Oct 2022.
9. Robust and Indirectly Supervised Information Extraction. *Invited talk, CS Department Seminar (remote), Nanjing University*. Sept 2022.
10. Robust and Indirectly Supervised Information Extraction. *Invited talk, Apple, San Jose*. Aug 2022.
11. Robust and Indirectly Supervised Information Extraction. *Invited talk, Microsoft CSR Distinguished Talk Series*. July 2022.
12. New Frontiers of Information Extraction. *Half-day Tutorial at NAACL*. July, 2022.
13. Understanding Event Processes in Natural Language. *Invited talk, NLP Seminar, UC Santa Cruz*. April 2022.
14. Understanding Event Processes in Natural Language. *Invited talk, CS Department Seminar, Rutgers–New Brunswick*. March 2022.
15. Understanding Event Processes in Natural Language. *Invited talk, ML Seminar, Purdue University*. Sept 2021.
16. Understanding Event Processes in Natural Language. *Invited talk, Tencent AI Lab, Seattle*. Sept 2021.
17. Understanding Event Processes in Natural Language. *Invited talk, University of Central Florida.* Aug 2021.
18. Understanding Event Processes in Natural Language. *Invited talk, IBM Research Almaden.* July 2021.
19. Understanding Event Processes in Natural Language. *Invited talk, CS Department Seminar, Fudan University.* June 2021.
20. Understanding Event Processes in Natural Language. *Invited talk, CS Department Seminar, Nanjing University.* June 2021.
21. Understanding Event Processes in Natural Language. *Invited talk, NLP Seminar, National University of Singapore.* May 2021.
22. Understanding Event Processes in Natural Language. *Invited talk, NLP Seminar, OSU*. May 2021
23. Understanding Event Processes in Natural Language. *Invited talk, CS Research Colloquium, UCSB.* April 2021

24. Understanding Event Processes in Natural Language. *Invited talk, Frontier Topics in Vision and Language, ASU*. Mar 2021.
25. Understanding Event Processes in Natural Language. *Invited talk at Machine Learning and Big Data Seminar, UCLA*. Nov 2020
26. Event-Centric Natural Language Processing. *Half-day Tutorial at ACL.* Aug, 2021.
27. From Tables to Knowledge: Recent Advances in Table Understanding. *Half-day Tutorial at KDD.* Aug, 2021.
28. Understanding Event Processes in Natural Language. Understanding Event Processes in Natural Language. *Invited talk at Language Technology Seminar, University of Cambridge*. Nov 2020
29. Event-Centric Natural Language Understanding. *Half-day Tutorial at AAAI.* Feb, 2021.
30. Knowledge Acquisition with Transferable Representation Learning. *CS Research Colloquium, USC.* Nov 2020
31. Knowledge Acquisition with Transferable Representation Learning. *AI Seminar, USC ISI*. Los Angeles, Jan 2020.
32. Knowledge Acquisition with Transferable Representation Learning. *IBM Research Almaden.* San Jose, Jan 2020.
33. Knowledge Acquisition with Transferable Representation Learning. *Invited talk at FDSiF. Fudan Univ., Shanghai, China.* Dec 2019.
34. Knowledge Acquisition with Transferable Representation Learning. *Invited talk at SNAP Seminar, Stanford University*. Jan 2019.
35. Knowledge Acquisition with Transferable Representation Learning. *Machine Learning and Big Data Seminar, UCLA.* Jan 2019.
36. Recent Advances in Transferable Representation Learning. *Half-day tutorial at AAAI.* NYC, NY, Feb 2020.
37. Neural Article Pair Modeling for Wikipedia Sub-article Matching. *Google Search Intelligence Seminar Talk*. Sept 2017
38. Reasoning Across Multiple Spatiotemporal Granularity Systems. *Invited talk at Teradata Labs. El Segundo, CA, USA.* Mar 2015

INDUSTRIAL EXPERIENCE

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

- **Research Intern**, *Embedding Edge-attributed Relational Hierarchies.* [P71]

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

- **Research Intern**, *Neural Article Pair Modeling for Large-scale Sub-article Relation Extraction.* [P79,P76,P63]

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

- **System SDE Intern**, *Dynamic Shard-partitioning for Large-scale Windowed Event Streams.*

Teradata Labs, Los Angeles, CA (Optimizer Group) *2015.6~2015.9*

- **R&D Intern**, *Multi-task Learning for Cost-based Database Optimizers.*