Muhao Chen

Assistant Professor of Computer Science, UC Davis.
Email: muhchen@ucdavis.edu Homepage: https://muhaochen.github.io/ Group Website: https://luka-group.github.io/

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 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.

P2 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.

P3 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.

P4 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.

P5 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.

P6 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.

P7 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.

P8 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.

P9 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.

P10 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.

P11 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.

P12 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.

P13 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.

P14 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.

P15 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.

P16 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.

P17 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.

P18 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.

P19 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.

P20 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.

P21 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.

P22 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.

P23 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.

P24 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.

P25 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.

P26 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.

P27 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.

P28 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.

P29 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.

P30 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.

P31 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)

P32 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.

P33 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.

P34 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.

P35 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.

P36 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.

P37 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.

P38 Fangyu Liu, **Muhao Chen**, Dan Roth, Nigel Collier. Visual Pivoting for (Unsupervised) Entity Alignment. In *the 35th AAAI Conference on Artificial Intelligence* (**AAAI**), 2021.

P39 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.

P40 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.

P41 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.

P42 **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.

P43 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.

P44 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.

P45 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.

P46 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.

P47 **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**

P48 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.

P49 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.

P50 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.

P51 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.

P52 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.

P53 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.

P54 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%)

P55 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

P56 **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

P57 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.

P58 Xuelu Chen, **Muhao Chen**, Weijia Shi, Yizhou Sun, Carlo Zaniolo. Uncertain Knowledge Graphs Embeddings. In *the 33rd International Conference on Artificial Intelligence* (**AAAI**), 2019.

P59 **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.

P60 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.

P61 **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.

P62 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.

P63 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.

P64 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.

P65 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.

P66 **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.

P67 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.

P68 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.

P69 **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)

P70 **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.

P71 **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

P72 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.

P73 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.

P74 **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.

P75 **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.

P76 **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: *On Faithfulness of Information Extraction* 2023-2024
- $73.8K unrestricted fund + $20K AWS credits. (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: *Knowledge Needed in Context*. 2022-2023
- $308K my share. (Co-PI, Lead of TA-B)

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

***Robust Table-Text Understanding with Structure-Aware Equivariance Pre-training*.** 2022-2023
- Gift award from Amazon Alexa. PI of $50K unrestricted fund.

***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*. 2021-2023
- $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 at USC

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

Jianzhi Yang, USC PhD Student in Quantitative and Computational Biology. (Chair: Mark Chaisson)
Tejas Srinivasan, USC PhD Student in Computer Science. (Chair: Jesse Thomason)
Binh Vu, USC PhD Student in Computer Science. (Chair: Craig Knoblock)
Yizhou Zhang, USC PhD Student in Computer Science. (Chair: Yan Liu)
Jihoon Sohn, USC PhD in Mathematics, 2022. (Chair: Francis Bonahon)
Tianran Zhang, UCLA PhD in Bioengineering, 2022. (Chair: Alex Bui)
Peifeng Wang, USC PhD Student in Computer Science. (Chair: Pedro Szekely)
Michiel de Jong, USC PhD Student in Computer Science. (Chair: Leana Golubchik)
Minh Pham, USC PhD in Computer Science, 2022. (Chair: Craig Knoblock)
Kexuan Sun, USC PhD Student in Computer Science. (Chair: Jay Pujara)
Xuelu (Shirley) Chen, UCLA PhD in Computer Science, 2021. (Chair: Carlo Zaniolo)
Jeong Hyun An, USC M.S. in Computer Science, 2022. (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.* [P61]

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

- **Research Intern**, *Neural Article Pair Modeling for Large-scale Sub-article Relation Extraction.* [P69,P66,P53]

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.*