Hangfeng He

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Research Interests

My research interests include natural language processing and machine learning, with a focus on deep learning interpretability, reasoning in natural language, and evaluation of large language models.

Academic Positions

University of Rochester, Rochester, NY, USA 2022-present
Assistant Professor in Computer Science and Data Science

Education

University of Pennsylvania, Philadelphia, PA, USA 2017-2023
Ph.D. in Computer and Information Science
Advisors: Dan Roth and Weijie Su
Peking University, Beijing, China 2013-2017
B.S. in Computer Science, *Summa Cum Laude*

Publications

1. Jiarui Wu, Zhuo Liu, and **Hangfeng He**. 2025. "Mitigating Hallucinations in Multimodal Spatial Relations through Constraint-Aware Prompting." In *2025*

Annual Conference of the Nations of the Americas Chapter of the Association for Computational Linguistics (NAACL). Short papers.

2. Xinyi Liu, Pinxin Liu, and **Hangfeng He.** 2024. An Empirical Analysis on Large Language Models in Debate Evaluation. In *Proceedings of the 62nd Annual Meeting of the Association for Computational Linguistics (ACL). Short papers*.

3. **Hangfeng He**, Hongming Zhang, and Dan Roth. 2024. SocREval: Large Language Models with the Socratic Method for Reference-Free Reasoning Evaluation. In *Proceedings of 2024 Annual Conference of the North American Chapter of the Association for Computational Linguistics (NAACL). Findings*.

4. Sindhu Kishore and **Hangfeng He.** 2024. Unveiling Divergent Inductive Biases of LLMs on Temporal Data. In *Proceedings of 2024 Annual Conference of the North American Chapter of the Association for Computational Linguistics (NAACL). Short papers*.

5. Matteo Sordello, Niccolo Dalmasso, **Hangfeng He**, and Weijie Su. 2024. Robust Learning Rate Selection for Stochastic Optimization via Splitting Diagnostic. In *Transactions on Machine Learning Research (TMLR)*.

6. **Hangfeng He** and Weijie Su. 2023. A Law of Data Separation in Deep Learning. In *Proceedings of the National Academy of Sciences (PNAS). Direct submission*.

7. Kaifu Wang, **Hangfeng He**, Tin Nguyen, Piyush Kumar, and Dan Roth. 2023. On Regularization and Inference with Label Constraints. In *International Conference on Machine Learning (ICML)*.

8. Mohammad Rostami, **Hangfeng He**, Muhao Chen, and Dan Roth. 2022. Transfer Learning via Representation Learning. In *Federated and Transfer Learning. Book Chapter*.

9. Shuxiao Chen, Koby Crammer, **Hangfeng He**, Dan Roth, and Weijie Su (**alphabetical order**). 2022. Weighted Training for Cross-Task Learning. In *International Conference on Learning Representations (ICLR). Oral presentation*.

10. Cong Fang, **Hangfeng He**, Qi Long, and Weijie Su (**alphabetical order**). 2021. Exploring Deep Neural Networks via Layer-Peeled Model: Minority Collapse in Imbalanced Training. In *Proceedings of the National Academy of Sciences (PNAS). Direct submission.*

11. **Hangfeng He**, Mingyuan Zhang, Qiang Ning, and Dan Roth. 2021. Foreseeing the Benefits of Incidental Supervision. In *Proceedings of the 2021 Conference on Empirical Methods in Natural Language Processing (EMNLP).*

12. Zhun Deng, **Hangfeng He**, and Weijie Su. 2021. Toward Better Generalization Bounds with Locally Elastic Stability. In *International Conference on Machine Learning (ICML).*

13. Ayal Klein, Jonathan Mamou, Valentina Pyatkin, Daniela Brook Weiss, **Hangfeng He**, Dan Roth, Luke Zettlemoyer, and Ido Dagan. 2020. QANom: Question-Answer driven SRL for Nominalizations. In *Proceedings of the 28th International Conference on Computational Linguistics (COLING).*

14. Shuxiao Chen, **Hangfeng He**, and Weijie Su (**alphabetical order**). 2020. Label-Aware Neural Tangent Kernel: Toward Better Generalization and Local Elasticity. In *Advances in Neural Information Processing Systems (NeurIPS).*

15. Zhun Deng, **Hangfeng He**, Jiaoyang Huang, and Weijie Su. 2020. Towards Understanding the Dynamics of the First-Order Adversaries. In *International Conference on Machine Learning (ICML).*

16. **Hangfeng He**, Qiang Ning, and Dan Roth. 2020. QuASE: Question-Answer Driven Sentence Encoding. In *Proceedings of the 58th Annual Meeting of the Association for Computational Linguistics (ACL).*

17. Soham Dan, **Hangfeng He**, and Dan Roth. 2020. Understanding Spatial Relations through Multiple Modalities. In *Proceedings of the 12th Language Resources and Evaluation Conference (LREC). Short papers.*

18. **Hangfeng He** and Weijie Su. 2020. The Local Elasticity of Neural Networks. In *International Conference on Learning Representations (ICLR).*

19. Qiang Ning, **Hangfeng He**, Chuchu Fan, and Dan Roth. 2019. Partial or Complete, That's The Question. In *Proceedings of the 2019 Conference of the North American Chapter of the Association for Computational Linguistics (NAACL)*.

20. Jingjing Xu, **Hangfeng He**, Xu Sun, Xuancheng Ren, and Sujian Li. 2018. Cross-domain and semisupervised named entity recognition in chinese social media: A unified model. In *IEEE/ACM Transactions on Audio, Speech, and Language Processing (TASLP)*.

21. Federico Fancellu, Adam Lopez, Bonnie Webber, and **Hangfeng He**. 2017. Detecting negation scope is easy, except when it isn't. In *Proceedings of the 15th Conference of the European Chapter of the Association for Computational Linguistics (EACL). Short papers.*

22. **Hangfeng He** and Xu Sun. 2017. F-Score Driven Max Margin Neural Network for Named Entity Recognition in Chinese Social Media. In *Proceedings of the 15th Conference of the European Chapter of the Association for Computational Linguistics (EACL). Short papers*.

23. **Hangfeng He** and Xu Sun. 2017. A Unified Model for Cross-Domain and Semi-Supervised Named Entity Recognition in Chinese Social Media. In *Proceedings of the AAAI Conference on Artificial Intelligence (AAAI)*.

24. **Hangfeng He**, Federico Fancellu, and Bonnie Webber. 2017. Neural Networks for Negation Cue Detection in Chinese. In *Proceedings of the Workshop Computational Semantics Beyond Events and Roles (SemBEaR)*.

Preprints

1. **Hangfeng He** and Weijie Su. 2024. A Law of Next-Token Prediction in Large Language Models. In *arXiv preprint*.

2. Ding Yu, Zhuo Liu, and **Hangfeng He**. Same Company, Same Signal: The Role of Identity in Earnings Call Transcripts. In *arXiv preprint*.

3. Zhuo Liu, Ding Yu, and **Hangfeng He**. On the Role of Model Prior in Real-World Inductive Reasoning. In *arXiv preprint*.

4. Hang Hua, Yunlong Tang, Ziyun Zeng, Liangliang Cao, Zhengyuan Yang, **Hangfeng He**, Chenliang Xu, and Jiebo Luo. MMCOMPOSITION: Revisiting the Compositionality of Pre-trained Vision-Language Models. In *arXiv preprint*.

5. **Hangfeng He**, Hongming Zhang, and Dan Roth. 2023. Rethinking with Retrieval: Faithful Large Language Model Inference. In *arXiv preprint*.

Teaching

CSC 511: Large Language Models
Fall 2024

CSC 247/447: Natural Language Processing
Spring 2023, Fall 2023, Spring 2025

CSC 442: Artificial Intelligence
Fall 2022

Professional Service

Area Chair
IJCNLP-AACL (2023)

Senior Program Committee Member
AAAI (2023)

Program Committee Member
ACL (2020-2021), COLING (2025), EMNLP (2019), NAACL (2019)

Conference Reviewer
ARR (2021, 2024), ICLR (2024), ICML (2021, 2023), NeurIPS (2020)

Journal Reviewer
IEEE TNNLS (2018-2020), TACL (2023)

University Service

AI BS and PhD Programs Committee	2024-present
Data Science Working Group Co-Chair	2023-present
Data Science M.S. Admission Committee	2022-present
Computer Science Faculty Search Committee	2024-2025
Computer Science Graduate Education Committee	2024-2025
Computer Science Undergraduate Education Committee	2023-2024
Annual URCS Newsletter Committee	2023-2024
Computer Science Ph.D. Admission Committee	2022-2023
Data Science Faculty Search Committee	2022-2023

Invited Talks

A Law of Data Separation in Deep Learning

Invited Session Talk at JSM, August, 2023

Invited Session Talk at ICSA, June, 2023

Moving Beyond Scale-Driven Learning

Invited Talk at UR GIDS, October, 2022

Local Elasticity: A Phenomenological Approach Toward Understanding Deep Learning

Invited Talk at uOttawa TML seminar, November, 2021

Incidental Supervision for Natural Language Understanding

Invited Talk at USC/ISI AI Seminar, October, 2021