Hangfeng He

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Research Interests

My research interests include natural language processing and machine learning, with a focus on geometrization approaches towards understanding deep learning, theoretical formulation of reasoning in natural language, and understanding the structure of data through the lens of evaluation.

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

Publications

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

sion.

2. 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).*

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

4. 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*.

5. 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.*

6. **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).*

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

8. 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).*

9. 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).*

10. 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)*.

11. **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)*.

12. 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.*

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

14. 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: Human Language Technologies (NAACL-HLT)*.

15. 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)*.

16. 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.*

17. **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*.

18. **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)*.

19. **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**, Hongming Zhang, and Dan Roth. 2023. Rethinking with Retrieval: Faithful Large Language Model Inference. In *arXiv preprint*.
2. Matteo Sordello, **Hangfeng He**, and Weijie Su. 2019. Robust Learning Rate Selection for Stochastic Optimization via Splitting Diagnostic. In *arXiv preprint*.

Teaching

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

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), EMNLP (2019), NAACL (2019)

Conference Reviewer

ACL Rolling Review (2021), ICML (2021, 2023), NeurIPS (2020)

Journal Reviewer

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

University Service

Data Science Faculty Search Committee 2023

Computer Science Ph.D. Admission Committee 2023

Data Science M.S. Admission Committee 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