

# Hangfeng He

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## Research Interests

My research interests include machine learning and natural language processing, with a focus on moving beyond scale-driven learning. Specifically, I work on incidental supervision for natural language understanding, interpretability of deep neural networks, reasoning in natural language, and structured data modeling.

## Education

<b>University of Pennsylvania</b> , Philadelphia, PA, USA	2017-present
Ph.D., Computer and Information Science	
Advisors: Dan Roth and Weijie Su	
<b>Peking University</b> , Beijing, China	2013-2017
B.S., Computer Science, <i>Summa Cum Laude</i>	

## Publications

1. 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*.
2. 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*.

3. **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)*.
4. Zhun Deng, **Hangfeng He**, and Weijie Su. 2021. Toward Better Generalization Bounds With Locally Elastic Stability. In *International Conference on Machine Learning (ICML)*.
5. 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)*.
6. 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)*.
7. 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)*.
8. **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)*.
9. 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*.
10. **Hangfeng He** and Weijie Su. 2020. The Local Elasticity of Neural Networks. In *International Conference on Learning Representations (ICLR)*.
11. 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)*.

12. 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)*.
13. 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*.
14. **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*.
15. **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)*.
16. **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. Matteo Sordello, **Hangfeng He**, and Weijie Su. 2019. Robust Learning Rate Selection for Stochastic Optimization via Splitting Diagnostic. In *arXiv preprint*.

## Research Experience

<b>Research Assistant.</b> Peking University	2017
Mentor: Tingting Jiang	
Project: Image caption	
<b>Research Assistant.</b> University of Edinburgh	2016

Mentor: Bonnie Webber

Project: Negation detection in Chinese

**Research Assistant.** Peking University 2015

Mentor: Xu Sun

Project: Named entity recognition in Chinese social media

## Teaching Experience

### University of Pennsylvania

**CIS 419/519 Applied Machine Learning** Fall 2019

*Head Teaching Assistant*; Instructor: Dan Roth

**CIS 419/519 Applied Machine Learning** Spring 2018

*Teaching Assistant*; Instructor: Dan Roth

## Mentoring Experience

**Wanping Dong**, PKU Undergraduate Student in Applied Math 2021

*Worked on understanding the optimization of deep learning with local elasticity.*

**Gang Wen**, PKU Undergraduate Student in Statistics 2021

*Worked on understanding the optimization of deep learning with local elasticity.*

**Celine Lee**, Penn Undergraduate Student (Now a PhD at Cornell) 2020

*Worked on zero-shot/few-shot event extraction.*

**Tianyi Zhang**, Penn MS Student in Data Science 2020

*Worked on zero-shot/few-shot event extraction.*

**Shikhar Brajesh**, Penn MS Student in Computer Science 2019

*Worked on extended semantic role labeling.*

**Chenchen Hu**, Penn MS Student in Computer Science (Now at Google) 2018

*Worked on extended semantic role labeling.*

**Zhengyuan Xu**, Penn MS Student in Computer Science (Now at Amazon) 2018  
*Worked on ethnic discrimination in criminal sentencing in China.*

**Ignacio Arranz**, Penn MS Student in Data Science (Now at Reddit) 2018  
*Worked on self identification on Reddit.*

**Aditya Kashyap**, Penn MS Student in Data Science (Now a PhD at Penn) 2018  
*Worked on self identification on Reddit.*

## Professional Service

### Program Committee Member

ACL (2019-2021), EMNLP (2019), NAACL (2019)

### Conference Reviewer

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

### Journal Reviewer

IEEE TNNLS (2018-2020)

## Honors & Awards

**Graduate Fellowship Award**, University of Pennsylvania 2017

**Outstanding Undergraduate**, Peking University 2017

**Weiling Scholarship**, Peking University 2016

**Jianeng Scholarship**, Peking University 2015

**May Fourth Scholarship**, Peking University 2014

## Invited Talks

### Incidental Supervision for Natural Language Understanding

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

# **Local Elasticity: A Phenomenological Approach Toward Understanding Deep Learning**

Invited Talk at uOttawa TML seminar, November, 2021

## **Skills**

**Programming:** Python, Java, C, C++, C#

**Tools & Frameworks:** L<sup>A</sup>T<sub>E</sub>X, Vim, PyTorch, Theano

## **References**

**Dr. Dan Roth** Eduardo D. Glandt Distinguished Professor  
Computer and Information Science, University of Pennsylvania

**Dr. Weijie Su** Assistant Professor  
Wharton Statistics and Data Science, University of Pennsylvania

**Dr. Bonnie Webber** Honorary Professor  
Institute for Language, Cognition and Computation, University of Edinburgh

**Dr. Tom Mitchell** Founders University Professor  
School of Computer Science, Carnegie Mellon University