Hao Peng

Contact Information

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Employment Experience

Assistant Professor — Starting 08/2023
University of Illinois Urbana-Champaign, Department of Computer Science

Young Investigator — 07/2022 - *present*
Allen Institute for Artificial Intelligence

Research Assistant with Noah A. Smith — 09/2016 - 08/2022
University of Washington

Research Intern with Lingpeng Kong and Dani Yogatama — 06/2020 - 12/2020
DeepMind

Research Intern with Dipanjan Das — 06/2018 - 12/2018
Google

Research Intern with Chin-Yew Lin — 10/2015 - 06/2016
Microsoft Research Asia

Research Asistant with Charles Sutton — 07/2015 - 09/2015
University of Edinburgh

Research Assistant with Zhi Jin — 07/2014 - 06/2015
Peking University

Education

University of Washington, Seattle, WA — 2016 - 2022
Ph.D. in Computer Science and Engineering
Advisor: Noah A. Smith

University of Washington, Seattle, WA — 2016 - 2018
M.S. in Computer Science and Engineering
Advisor: Noah A. Smith

Peking Univeristy, Beijing, China — 2012 - 2016
B.S. in Computer Science, *Summa Cum Laude*

Research Interests

Natural Language Processing, Computational Linguistics,
Machine Learning

Honors and Awards

Google Ph.D. Fellowship, 2019

Honorable Mention for Best Paper at ACL, 2018

Jeff Dean - Heidi Hopper Endowed Regental Fellowship, UW, 2016

Research Excellence Award, PKU, 2015

Foundation Fellowship, PKU, 2015

May the Fourth Fellowship, PKU, 2014

Selected Talks

ABC: Attention with Bounded-memory Control
– Invited talk at the University of Hongkong
Virtual. July, 2021

Random Feature Attention
– Invited talk at Peking University
Virtual. May, 2021
– ICLR conference
Virtual. May, 2021
– Invited talk at DeepMind machine translation reading group
Virtual. March, 2021
– Invited talk at DeepMind
Virtual. December, 2020

Rational Recurrences
– Invited talk at the University of Alberta
Virtual. June, 2020
– Invited talk at Peking University
Beijing, China. December, 2018
– EMNLP conference
Brussels, Belgium. October, 2018

A Mixture of $h-1$ Heads is Better than h Heads
– ACL conference
Virtual. July, 2020

Text Generation with Exemplar-based Adaptive Decoding
– NAACL conference
Minneapolis. June, 2019

Backpropagating through Structured Argmax using a SPIGOT
– ACL conference
Melbourne, Australia. July, 2018

Learning Joint Semantic Parsers from Disjoint Data
– NAACL conference
New Orleans. June, 2018

Deep Multitask Learning for Semantic Dependency Parsing
– Invited talk at New York University Shanghai
Shanghai, China. December, 2017

Teaching Experience

Teaching Assistant at Paul G. Allen School of CSE, University of Washington

Machine Learning and Big Data	Spring 2022
Natural Language Processing	Winter 2019

Teaching Assistant at EECS, Peking University

Introduction to Computer System	Fall 2015
Introduction to Computer System	Fall 2014

Professional Service

Area chairs: EMNLP (2022), AACL-IJCNLP (2022)

Journal reviewing: TACL (2021)

Program comittee member/reviewer: ACL Rolling Review (2021, 2022), ACL (2016–2021), EMNLP (2016–21), NAACL (2018, 2019, 2021), CoNLL (2019–2021), EACL (2017), ICLR (2019–2023), NeurIPS (2019–2021), ICML (2019–2021), KDD (2016)

Publications

Yao Fu, Hao Peng, Ashish Sabharwal, Peter Clark, and Tushar Khot. Complexity-Based Prompting for Multi-Step Reasoning. Under review, 2022.

Zhaofeng Wu, William Merrill, **Hao Peng**, Iz Beltagy, and Noah A. Smith. Transparency Helps Reveal When Language Models Learn Meaning. Under review, 2022.

Michael Hassid, **Hao Peng**, Daniel Rotem, Jungo Kasai, Ivan Montero, Noah A. Smith, and Roy Schwartz. How Much Does Attention Actually Attend? Questioning the Importance of Attention in Pretrained Transformers. In *Findings of the Conference on Empirical Methods in Natural Language Processing*, 2022.

Zhaofeng Wu, **Hao Peng**, Nikolaos Pappas, and Noah A. Smith. Modeling Context With Linear Attention for Scalable Document-Level Translation. In *Findings of the Conference on Empirical Methods in Natural Language Processing*, 2022.

Jungo Kasai, Keisuke Sakaguchi, Ronan Le Bras, **Hao Peng**, Ximing Lu, Dragomir Radev, Yejin Choi, and Noah A. Smith. Twist Decoding: Diverse Generators Guide Each Other. In *Proceedings of the Conference on Empirical Methods in Natural Language Processing*, 2022.

Hao Peng, Jungo Kasai, Nikolaos Pappas, Dani Yogatama, Zhaofeng Wu, Lingpeng Kong, Roy Schwartz, and Noah A. Smith. ABC: Attention with Bounded-memory Control. In *Proceedings of the Annual Meeting of the Association for Computational Linguistics*, 2022.

Alexis Ross[1], Tongshuang Wu[1], **Hao Peng**, Matthew E. Peters, and Matt Gardner. Tailor: Generating and Perturbing Text with Semantic Controls. In *Proceedings of the Annual Meeting of the Association for Computational Linguistics*, 2022. [1] = equal contribution.

Jungo Kasai, **Hao Peng**, Yizhe Zhang, Dani Yogatama, Gabriel Ilharco, Nikolaos Pappas, Yi Mao, Weizhu Chen, and Noah A. Smith. Finetuning Pretrained Transformers into RNNs. In *Proceedings of the Conference on Empirical Methods in Natural Language Processing*, 2021.

Hao Peng, Nikolaos Pappas, Dani Yogatama, Roy Schwartz, Noah A. Smith, and Lingpeng Kong. Random Feature Attention. In *Proceedings of the Conference of the International Conference on Learning Representations*, 2021. **Spotlight.**

Jungo Kasai, Nikolaos Pappas, **Hao Peng**, James Cross, and Noah A. Smith. Deep En-

coder, Shallow Decoder: Reevaluating the Speed-Quality Tradeoff in Machine Translation. In *Proceedings of the Conference of the International Conference on Learning Representations*, 2021.

Dianqi Li, Yizhe Zhang, **Hao Peng**, Liqun Chen, Chris Brockett, Ming-Ting Sun, and Bill Dolan. Contextualized Perturbation for Textual Adversarial Attack. In *Proceedings of the Conference of the North American Chapter of the Association for Computational Linguistics*, 2021.

Zhaofeng Wu, **Hao Peng**, and Noah A. Smith. Infusing Finetuning with Semantic Dependencies. *Transactions of the Association for Computational Linguistics*, 2020.

Hao Peng, Roy Schwartz, Dianqi Li, and Noah A. Smith. A Mixture of $h - 1$ Heads is Better than h Heads. In *Proceedings of the Annual Meeting of the Association for Computational Linguistics*, 2020.

Hao Peng, Roy Schwartz, and Noah A. Smith. PaLM: A Hybrid Parser and Language Model. In *Proceedings of the Conference on Empirical Methods in Natural Language Processing*, 2019.

Jesse Dodge, Roy Schwartz, **Hao Peng**, and Noah A. Smith. RNN Architecture Learning with Sparse Regularization. In *Proceedings of the Conference on Empirical Methods in Natural Language Processing*, 2019.

Hao Peng, Ankur P. Parikh, Manaal Faruqui, Bhuwan Dhingra, and Dipanjan Das. Text Generation with Exemplar-based Adaptive Decoding. In *Proceedings of the Conference of the North American Chapter of the Association for Computational Linguistics*, 2019.

Hao Peng, Roy Schwartz, Sam Thomson, and Noah A. Smith. Rational Recurrences. In *Proceedings of the Conference on Empirical Methods in Natural Language Processing*, 2018.

Hao Peng, Sam Thomson, and Noah A. Smith. Backpropagating through Structured Argmax using a SPIGOT. In *Proceedings of the Annual Meeting of the Association for Computational Linguistics*, 2018. **Honorable Mention for Best Paper Award.**

Hao Peng, Sam Thomson, Swabha Swayamdipta, and Noah A. Smith. Learning Joint Semantic Parsers from Disjoint Data. In *Proceedings of the Conference of the North American Chapter of the Association for Computational Linguistics*, 2018.

Chenhao Tan, **Hao Peng**, and Noah A. Smith. "You are no Jack Kennedy": On Media Selection of Highlights from Presidential Debates. In *Proceedings of the International World Wide Web Conference*, 2018.

Hao Peng, Sam Thomson, and Noah A. Smith. Deep Multitask Learning for Semantic Dependency Parsing. In *Proceedings of the Annual Meeting of the Association for Computational Linguistics*, 2017.

Hao Peng, Jing Liu, and Chin-Yew Lin. News Citation Recommendation with Implicit and Explicit Semantics. In *Proceedings of the Annual Meeting of the Association for Computational Linguistics*, 2016.

Miltiadis Allamanis, **Hao Peng**, and Charles Sutton. A Convolutional Attention Network for Extreme Summarization of Source Code. In *Proceedings of the International Conference on Machine Learning*, 2016.

Hao Peng[1], Lili Mou[1], Ge Li, Yan Xu, Lu Zhang, and Zhi Jin. Discriminative Neural Sentence Modeling by Tree-based Convolution. In *Proceedings of the Conference on Empirical Methods in Natural Language Processing*, 2015. [1] = equal contribution.

Hao Peng[1], Lili Mou[1], Ge Li, Yunchuan Chen, Yangyang Lu, and Zhi Jin. A Comparative Study on Regularization Strategies for Embedding-based Neural Networks. In *Proceedings of the Conference on Empirical Methods in Natural Language Processing*, 2015. [1] = equal contribution.

Yan Xu, Lili Mou, Ge Li, Yunchuan Chen, **Hao Peng**, and Zhi Jin. Classifying Relations via Long Short Term Memory Networks along Shortest Dependency Paths. In *Proceedings of the Conference on Empirical Methods in Natural Language Processing*, 2015.

Hao Peng, Lili Mou, Ge Li, Yuxuan Liu, Lu Zhang, and Zhi Jin. Building Program Vector Representations for Deep Learning. In *Proceedings of International Conference on Knowledge Science, Engineering and Management*, 2015.

Skills

Programming Languages: Python, C/C++, CUDA, LaTeX
Maths & Statistical Package: PyTorch, JAX, TensorFlow, DyNet

References

Noah A. Smith (Doctoral Advisor)
Amazon Professor of Machine Learning — UW Paul G. Allen School of CSE
Senior Research Manager — Allen Institute for AI
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Luke Zettlemoyer
Professor — UW Paul G. Allen School of CSE
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Chris Dyer
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