

Work and Research Experience

Research Scientist **May. '23 — Aug. '23**

MIT-IBM Waston AI Lab

- Designed finetuning algorithm for large language model compression and specialization.
- Developed new architecture and training methods for modular large language models.

Research Assistant **Aug. '21 — Present**

University of Toronto, advised by Prof. Colin Raffel (formerly at UNC Chapel Hill)

- Designed experiments to analyze mixture-of-experts models.
- Designed parameter-efficient few-shot learning methods for large pretrained models.
- Coordinated team projects on parameter-efficient finetuning and novel model-developing paradigms.

Student Researcher **Jun. '22 — Dec. '22**

Google Translate Research, Google

- Performed experiments on improving translation models with self-supervision on monolingual corpora.
- Conducted scaling law analysis on the training time cost and performance improvement.

Predoctoral Young Investigator **Jan. '21 — Aug. '21**

Semantic Scholar, Allen Institute for AI

- Upgraded TLDR, a paper summarization system, to improve the quality and scope.
- Designed pretrained language models for scientific documents.

Junior Research Scientist **Sept. '20 — Dec. '20**

Research Assistant **Feb. '19 — Aug. '20**

ML² at CILVR Lab, New York University, advised by Prof. Samuel R. Bowman

- Designed and coordinated research on ML methods and empirical analysis of NLP transfer learning.
- Designed and performed analysis on NLP evaluation.
- Performed experiments and analyses on the grammatical knowledge of pretrained transformers.
- Developed a flexible multitask NLP research codebase.

Research Intern **Mar. '18 — May '18**

Visual Retrieval Group, Bytedance AI Lab(TikTok)

- Improved image search results by implementing CNNs for image-to-text retrieval.

Research Assistant **Aug. '14 — May '18**

Key Laboratory of Machine Perception, Peking University, advised by Prof. Zhi-hong Deng

- Developed models and training methods to improve diversity in short-text conversation generation.
- Applied adversarial training methods to defend against adversarial examples in image classification.
- Designed hybrid NN models to mimic the top-down and bottom-up effects in image recognition.

Research Assistant **Oct. '16 — Aug. '17**

Machine Learning Group, University of Toronto, advised by Prof. Sanja Fidler

- Designed and implemented neural network architectures for long-document question answering.

Education

Ph.D. in Computer Science, University of Toronto **Nov. '23 — Present**

Ph.D. in Computer Science, UNC Chapel Hill **Aug. '21 — Nov. '23**

M.S. in Computer Science, New York University (GPA 3.83/4) **Sep. '18 — May '20**

Courses: Natural Language Understanding, Seminar in Semantics, Computational Cognitive Models

B.S. in Intelligence Science, Peking University (Major GPA 3.80/4) **Sep. '13 — Jun. '18**

Courses: Machine Learning, Pattern Recognition, Cognitive Neuroscience, Data Visualization

Publications

- 2023 Nikhil Kandpal, Brian Lester, Mohammed Muqeeth, Anisha Mascarenhas, Monty Evans, Vishal Baskaran, Tenghao Huang, **Haokun Liu**, Colin Raffel, Git-Theta: A Git Extension for Collaborative Development of Machine Learning Models. *ICML*.
- 2023 Mohammed Muqeeth, **Haokun Liu**, Colin Raffel. Soft Merging of Experts with Adaptive Routing. *Arxiv Preprint*
- 2022 Mohammed Muqeeth, **Haokun Liu**, Colin Raffel. Models with Conditional Computation Learn Suboptimal Solutions *NeurIPS Workshop ICBINB*.
- 2022 **Haokun Liu**,* Derek Tam,* Mohammed Muqeeth,* Jay Mohta, Tenghao Huang, Mohit Bansal, Colin Raffel. Few-shot parameter-efficient fine-tuning is better and cheaper than in-context learning. *NeurIPS*.
- 2021 Jason Phang, **Haokun Liu**, Samuel R. Bowman. Fine-Tuned Transformers Show Clusters of Similar Representations Across Layers. *EMNLP Workshop Blackbox NLP*.
- 2021 Clara Vania,* Phu Mon Htut,* William Huang,* Dhara Mungra, Richard Yuanzhe Pang, Jason Phang, **Haokun Liu**, Kyunghyun Cho, Samuel R. Bowman. Comparing Test Sets with Item Response Theory. *ACL*.
2020. William Huang, **Haokun Liu**, Samuel R. Bowman. Counterfactually-Augmented SNLI Training Data Does Not Yield Better Generalization Than Unaugmented Data. *EMNLP Workshop on Insights from Negative Results in NLP*.
2020. **Haokun Liu**,* William Huang,* Dhara A. Mungra, Samuel R. Bowman. Precise Task Formalization Matters in Winograd Schema Evaluations. *EMNLP*.
2020. Alex Warstadt, Yian Zhang, Haau-Sing Li, **Haokun Liu**, Samuel R. Bowman. Learning Which Features Matter: RoBERTa Acquires a Preference for Linguistic Generalizations (Eventually). *EMNLP*.
2020. Jason Phang,* Iacer Calixto* Phu Mon Htut, Yada Pruksachatkun, **Haokun Liu**, Clara Vania, Katharina Kann, Samuel R. Bowman. English Intermediate-Task Training Improves Zero-Shot Cross-Lingual Transfer Too. *AAACL-IJCNLP*.
2020. Yada Pruksachatkun,* Phil Yeres,* **Haokun Liu**, Jason Phang, Phu Mon Htut, Alex Wang, Ian Tenney, Samuel R. Bowman. jiant: A Software Toolkit for Research on General-Purpose Text Understanding Models. *ACL System Demo*.
2020. Yada Pruksachatkun,* Jason Phang,* **Haokun Liu**,* Phu Mon Htut,* Richard Phang, Xiaoyi Zhang, Clara Vania, Katharina Kann, Samuel R. Bowman. Intermediate-Task Transfer Learning with Pretrained Language Models: When and Why Does It Work? *ACL*.
2020. Alex Warstadt, Alicia Parrish, **Haokun Liu**, Sheng-Fu Wang, Wei Peng, Anhad Mohananey, Samuel R. Bowman. BLiMP: A Benchmark of Linguistic Minimal Pairs for English. *TACL*.
2019. Alex Warstadt,* Yu Cao,* Ioana Grosu,* Wei Peng,* Hagen Blix,* Yining Nie,* Anna Alsop,* Shikha Bordia,* **Haokun Liu**,* Alicia Parrish,* Sheng-Fu Wang,* Jason Phang,* Anhad Mohananey,* Phu Mon Htut,* Paloma Jereti*, Samuel R. Bowman. Investigating BERT's Knowledge of Language: Five Analysis Methods with NPIs. *EMNLP*.
2018. Meng Zou, Xihan Li, **Haokun Liu**, Zhihong Deng. MEMD: A Diversity-Promoting Learning Framework for Short-Text Conversation. *COLING*.

Programming Skills

Languages: Python

Tools: PyTorch, Transformers, Gin-config, Git, Matplotlib, Theano

Invited Talks

Ought	Jun. '22
Google, Prompt tuning team	Jun. '22

Outreach

NYU AI School, Teaching Assitant	Jan. '20
CityTutor, In-class Tutor for Adult Education	Feb. '19 - Dec. '19