HONGKANG LI

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EDUCATION

Rensselaer Polytechnic Institute, Troy, NY, United States August 2019 - December 2024
P.h.D., Electrical, Computer, and Systems Engineering
GPA: 4.0/4.0
Advisor: Prof. Meng Wang

University of Science and Technology of China, Hefei, China August 2015 - June 2019
Bachelor of Engineering
GPA: 3.73/4.3

RESEARCH INTEREST

Deep Learning Theory: deep learning theory, generalization analysis of (graph) neural networks, theoretical mechanism of large language models.
Efficient AI: data-efficient learning and inference.
Trustworthy Machine Learning: model explanation, fairness.

PROFESSIONAL EXPERIENCE

Postdoctoral Researcher June 2025 -
University of Pennsylvania
Supervisor: Prof. Rene Vidal

Postdoctoral Researcher January 2025 - May 2025
Rensselaer Polytechnic Institute
Supervisor: Prof. Meng Wang

Research Intern May 2023 - August 2023
IBM Research
Supervisor: Dr. Songtao Lu, Dr. Hui Wan, Dr. Xiaodong Cui

Graduate Research Assistant August 2019 - December 2024
Rensselaer Polytechnic Institute
Supervisor: Prof. Meng Wang

PUBLICATIONS

* denotes equal contribution

PREPRINT

Y. Zhang*, **H. Li*,** Y. Yao*, A. Chen, S. Zhang, P.-Y. Chen, M. Wang, S. Liu, "Visual Prompting Reimagined: The Power of Activation Prompts." *In submission.*

CONFERENCE

H. Li, Y. Zhang, S. Zhang, M. Wang, S. Liu, P.-Y. Chen. "When is Task Vector Provably Effective for Model Editing? A Generalization Analysis of Nonlinear Transformers, " *Accepeted by International Conference on Learning Representations (ICLR) as an* ***Oral Presentation*** *(**acceptance rate = 1.8%**), 2025.*

H. Li, M. Wang, S. Lu, X. Cui, and P.-Y. Chen. "Training Nonlinear Transformers for Chain-of-Thought Inference: A Theoretical Generalization Analysis" *Accepeted by International Conference on Learning Representations (ICLR)(**acceptance rate = 32.1%**), 2025.*

H. Li, M. Wang, S. Lu, X. Cui, and P.-Y. Chen. "How Do Nonlinear Transformers Learn and Generalize in In-Context Learning?" *Accepted by International Conference on Machine Learning (ICML)(**acceptance rate = 27.5%**), 2024.*

H. Li, M. Wang, T. Ma, S. Liu, Z. Zhang, P.-Y. Chen, "What Improves the Generalization of Graph Transformer? A Theoretical Dive into Self-attention and Positional Encoding. " *Accepted by International Conference on Machine Learning (ICML)(**acceptance rate = 27.5%**), 2024.*

H. Li, M. Wang, S. Liu, P.-Y. Chen, "A theoretical understanding of shallow vision transformers: Learning, generalization, and sample complexity." *Accepeted by International Conference on Learning Representations (ICLR)(**acceptance rate = 32.0%**), 2023.*

H. Li, M. Wang, S. Liu, P.-Y. Chen, and J. Xiong. "Generalization guarantee of training graph convolutional networks with graph topology sampling." *Accepted by International Conference on Machine Learning (ICML)(**acceptance rate = 21.9%**), 2022.*

H. Li, S. Zhang, and M. Wang. "Learning and generalization of one-hidden-layer neural networks, going beyond standard gaussian data." *Accepted by 2022 56th Annual Conference on Information Sciences and Systems (CISS). IEEE*

Y. Luo, **H. Li**, Q. Liu, L. Shi, X.-M. Wu. "Node Identifiers: Compact, Discrete Representations for Efficient Graph Learning, " *Accepeted by International Conference on Learning Representations (ICLR)(**acceptance rate = 32.1%**), 2025.*

Y. Luo, **H. Li,** L. Shi, X. Wu, "Enhancing Graph Transformers with Hierarchical Distance Structural Encoding." *Accepted by Annual Conference on Neural Information Processing Systems (Neurips) 2024.*

S. Zhang, **H. Li,** Meng Wang, Miao Liu, Pin-Yu Chen, Songtao Lu, Sijia Liu, Keerthiram Murugesan, Subhajit Chaudhury. "On the Convergence and Sample Complexity Analysis of Deep Q-Networks with -Greedy Exploration. " *Accepted by Annual Conference on Neural Information Processing Systems (Neurips) (**acceptance rate = 26.1%**), 2023.*

H. Wan, **H. Li,** Songtao Lu, Xiaodong Cui, Marina Danilevsky. "How Can Personalized Context Help? Exploring Joint Retrieval of Passage and Personalized Context. " *Accepted by IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2023.*

JOURNAL

H. Li, S. Zhang, M. Wang, Y. Zhang, P.-Y. Chen, S. Liu, "Theoretical characterization of neural network generalization group imbalance." *Accepted by IEEE Journal of Selected Topics in Signal Processing, 2024.*

WORKSHOP

H. Li, M. Wang, S. Zhang, S. Liu, P.-Y. Chen, "Learning on transformers is provable low-rank and sparse: A one-layer analysis." *Accepted by 2024 IEEE 13rd Sensor Array and Multichannel Signal Processing Workshop (SAM).*

TALKS

- NJIT DS Seminar — October 2024
  Theoretical Foundations of In-Context Learning and Chain-of-Thought with Trained Transformers
- IBM-RPI FCRC Seminar Series — February 2024
  Theoretical and Algorithmic Foundations of In-Context Learning Using Properly Trained Transformer Models

PRESS COVERAGE

- IBM Blog — July 2024
  IBM and RPI researchers demystify in-context learning in large language models

SERVICES

- Reviewer of ICML 2022-2024; Neurips 2022-2024; ICLR 2024-2025; CVPR 2024-2025; AAAI 2025; AISTATS 2024-2025; UAI 2023; ICASSP 2023-2024; TMLR 2023-2024; IEEE Transactions on Artificial Intelligence 2024; IEEE Transactions on Signal Processing 2024.

Mentor of research of three ECSE undergraduate students of RPI.

HONORS AND AWARDS

- **MLCommons ML and Systems Rising Star Award** — May 2025
- **ICLR 2025 Notable Reviewer** — May 2025
- **IEEE SAM Travel Grant**, — July 2024
- **Founders Award of Excellence**, Rensselaer Polytechnic Institute — October 2023
- **Belsky Award**, School of Engineering, Rensselaer Polytechnic Institute — January 2023
- **Zenghua Scholarship**, Top 5% of USTC — September 2018
- **Outstanding Student Scholarship**, USTC — 2016 - 2017