

# Ziqiao Wang

## Curriculum Vitae

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### Employment

- Sep. 2024 - **Assistant Professor**, Dept. of Computer Science and Technology, Tongji University, *Shanghai, China*.  
Now
- May 2019 - **Research Intern**, Digital Technologies Research Centre, National Research Council Canada (NRC),  
Dec. 2019 *Ottawa, Canada*.  
Mentor: Dr. Harry H.Y. Guo

### Education

- Jan. 2019 - **Ph.D, University of Ottawa, Ottawa, Ontario, Canada**.  
May 2024 Electrical and Computer Engineering  
Thesis: "Generalization in Machine Learning through Information-Theoretic Lens"  
Advisor: Yongyi Mao  
Committee: Maia Fraser, Tommaso R. Cesari, James R. Green, Ashish Khisti
- Sep. 2017 - **M.A.Sc, University of Ottawa, Ottawa, Ontario, Canada**.  
Dec. 2018 Electrical and Computer Engineering  
Advisor: Yongyi Mao
- Sep. 2013 - **B.Eng, North China Electric Power University (NCEPU), Baoding, Hebei, China**.  
Jun. 2017 Electrical Engineering and its Automation  
Advisor: Xiangyu Zhang

### Research Interests

- **Area:** Machine Learning, Statistical Learning Theory, Information Theory
- **Topics:** Generalization, Domain Adaptation, Trustworthy Machine Learning, Online Learning, Reinforcement Learning Theory

### Publications & Preprints

\* denotes equal contribution.

- Preprints P1 Fanshuang Kong, Richong Zhang and **Ziqiao Wang**. "Activated Parameter Locating via Causal Intervention for Model Merging." *Submitted*.
- P2 **Ziqiao Wang** and Yongyi Mao. "Generalization Bounds via Conditional  $f$ -Information." *Submitted*.
- P3 Hailang Huang, Richong Zhang, Zhijie Nie and **Ziqiao Wang**. "Cluster-based Absent Label Completion for Image-Text Retrieval." *Submitted*.
- P4 **Ziqiao Wang** and Yongyi Mao. "On  $f$ -Divergence Principled Domain Adaptation: An Improved Framework." *Submitted*.
- P5 Fanshuang Kong, Richong Zhang and **Ziqiao Wang**. "LH-Mix: Local Hierarchy Correlation Guided Mixup over Hierarchical Prompt Tuning." *Submitted*.
- P6 **Ziqiao Wang**, Yongyi Mao, Hongyu Guo and Richong Zhang. "On SkipGram Word Embedding Models with Negative Sampling: Unified Framework and Impact of Noise Distributions." *arXiv preprint arXiv:2009.04413, 2020*.

- Conference C1 **Ziqiao Wang** and Yongyi Mao. "Two Facets of SDE Under an Information-Theoretic Lens: Generalization of SGD via Training Trajectories and via Terminal States." *Proceedings of the Fortieth Conference on Uncertainty in Artificial Intelligence (UAI)*, 2024.
- C2 Fanshuang Kong, Richong Zhang, **Ziqiao Wang** and Yongyi Mao. "On Unsupervised Domain Adaptation: Pseudo Label Guided Mixup for Adversarial Prompt Tuning." *Proceedings of the AAAI Conference on Artificial Intelligence (AAAI)*, 2024.
- C3 Hailang Huang, Zhijie Nie, **Ziqiao Wang** and Ziyu Shang. "Cross-modal and Uni-modal Soft-label Alignment for Image-Text Retrieval." *Proceedings of the AAAI Conference on Artificial Intelligence (AAAI)*, 2024.
- C4 **Ziqiao Wang** and Yongyi Mao. "Sample-Conditioned Hypothesis Stability Sharpens Information-Theoretic Generalization Bounds." *Advances in Neural Information Processing Systems (NeurIPS)*, 2023.
- C5 **Ziqiao Wang** and Yongyi Mao. "Tighter Information-Theoretic Generalization Bounds from Supersamples." *International Conference on Machine Learning (ICML)*, 2023 (**Oral Presentation, top 2.2% of submissions**).
- C6 Zixuan Liu\*, **Ziqiao Wang**\*, Hongyu Guo and Yongyi Mao. "Over-Training with Mixup May Hurt Generalization." *International Conference on Learning Representations (ICLR)*, 2023.
- C7 **Ziqiao Wang** and Yongyi Mao. "Information-Theoretic Analysis of Unsupervised Domain Adaptation." *International Conference on Learning Representations (ICLR)*, 2023.
- C8 **Ziqiao Wang** and Yongyi Mao. "On the Generalization of Models Trained with SGD: Information-Theoretic Bounds and Implications." *International Conference on Learning Representations (ICLR)*, 2022.
- Workshop W1 **Ziqiao Wang** and Yongyi Mao. "On  $f$ -Divergence Principled Domain Adaptation: An Improved Framework." *18th Canadian Workshop on Information Theory (CWIT)*, 2024.
- Papers W2 **Ziqiao Wang** and Yongyi Mao. "Two Facets of SDE Under an Information-Theoretic Lens: Generalization of SGD via Training Trajectories and via Terminal States." *Mathematics of Modern Machine Learning (M3L) Workshop at NeurIPS 2023*.
- W3 Zixuan Liu\*, **Ziqiao Wang**\*, Hongyu Guo and Yongyi Mao. "Over-Training with Mixup May Hurt Generalization." *First Workshop on Interpolation Regularizers and Beyond at NeurIPS 2022*.

## Honors & Awards

- 2024 UAI 2024 Scholarship
  - Governor General's Academic Medal (Nominee for Spring 2025 Convocation)
  - Pierre Laberge Thesis Prize (Nominee for Spring 2025 Convocation)
- 2023 Top 10% Reviewers Award at NeurIPS 2023
  - ICLR 2023 Travel Award
- 2022-2024 INTER-MATH-AI Stipends from the NSERC CREATE program
- 2021-2024 Doctorate Admission Scholarship from University of Ottawa
- 2019-2024 International Doctoral Scholarship from University of Ottawa
- 2016 Merit Student of NCEPU
  - First-class Scholarship from NCEPU
  - First Prize of The Electrician Mathematical Contest in Modeling (EMCM)
  - Meritorious Winner of 2016 Interdisciplinary Contest in Modeling (ICM)
- 2015 Meritorious Winner of 2015 Mathematical Contest in Modeling (MCM)
  - Second Prize of China Undergraduate Mathematical Contest in Modeling (CUMCM)

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## Selected Talks

2023 **Tutorial on Information-Theoretic Generalization Bounds.**

- Prof. Yong Liu's research group (Remin University of China), *Virtual*, Dec. 2023

**Tighter Information-Theoretic Generalization Bounds from Supersamples.**

- INTER-MATH-AI Annual Workshop, *Station de biologie des Laurentides, St-Hippolyte, Canada, Aug. 2023*
- The 40th International Conference on Machine Learning (ICML 2023), *Honolulu, Hawaii, USA, Jul. 2023*
- Prof. Richong Zhang's research group, *Beihang University, Beijing, China, Jul. 2023*

**Over-Training with Mixup May Hurt Generalization.**

- "AI4D: The Science" seminar at National Research Council Canada, *Virtual*, Apr. 2023

**Information-Theoretic Analysis of Unsupervised Domain Adaptation.**

- Machine Learning Seminar at Department of Mathematics and Statistics, *University of Ottawa, Canada, Jan. 2023*

2019-2022 **On the Generalization of Models Trained with SGD: Information-Theoretic Bounds and Implications.**

- Prof. Yong Liu's research group (Gaoling School of Artificial Intelligence, Remin University of China), *Virtual*, Jul. 2022
- AI TIME (Department of Computer Science and Technology, Tsinghua University), *Virtual*, Jun. 2022
- "AI4D: The Science" seminar at National Research Council Canada, *Virtual*, Dec. 2021

**On SkipGram Word Embedding Models with Negative Sampling: Unified Framework and Impact of Noise Distributions.**

- The Text Analysis and Machine Learning (TAMALE) seminar, *University of Ottawa, Canada, Nov. 2019*

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## Professional Service

<b>Conference Reviewer</b>	NeurIPS (2023, 2024), ICML (2024), ICLR (2024, 2025), AISTATS (2024), AAAI (2025), IJCAI (2024), ISIT (2024), Neural Compression Workshop at ICML 2023
<b>Journal Reviewer</b>	IEEE Transactions on Information Theory (TIT), Transactions on Machine Learning Research (TMLR), IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), IEEE Journal on Selected Areas in Information Theory (JSAIT)
<b>Organizers</b>	The 2024 IEEE North American School of Information Theory (NASIT)

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## Teaching Experience

2018– 2023 **Teaching Assistant, University of Ottawa.**

- CSI 5138/5340[R00] Introduction to Deep Learning and Reinforcement Learning (2018-2019, 2021-2023)
- ELG 5170[A00] Information Theory (2020)
- GNG 1106[A00] Fundamentals of Engineering Computation (2020-2021, 2023)