

# Ziqiao Wang

## Curriculum Vitae

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### Education

- 2019–2024 **Ph.D, University of Ottawa, Ottawa, Ontario, Canada.**  
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
- 2017–2018 **M.A.Sc, University of Ottawa, Ottawa, Ontario, Canada.**  
Electrical and Computer Engineering  
Advisor: Yongyi Mao
- 2013–2017 **B.Eng, North China Electric Power University (NCEPU), Baoding, Hebei, China.**  
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

### Employment

- Jan. 2020 - **University of Ottawa, Ottawa, Canada.**  
Apr. 2024 Research Assistant  
Mentor: Prof. Yongyi Mao
- May 2019 - **National Research Council Canada (NRC), Ottawa, Canada.**  
Dec. 2019 Research Intern at Digital Technologies Research Centre  
Mentor: Dr. Harry H.Y. Guo
- Jul. 2017 - **Tsintergy Technology Co., Ltd., Beijing, China.**  
Aug. 2017 Intern of Electricity Market and Energy Internet

### Publications & Preprints

\* denotes equal contribution.

- Preprints P1 **Ziqiao Wang** and Yongyi Mao. “On  $f$ -Divergence Principled Domain Adaptation: An Improved Framework.” *Submitted*.
- P2 Fanshuang Kong, Richong Zhang and **Ziqiao Wang**. “LH-Mix: Local Hierarchy Correlation Guided Mixup over Hierarchical Prompt Tuning.” *Submitted*.
- P3 **Ziqiao Wang** and Yongyi Mao. “Two Facets of SDE Under an Information-Theoretic Lens: Generalization of SGD via Training Trajectories and via Terminal States.” *Submitted*.
- P4 **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 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.
- C2 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.
- C3 **Ziqiao Wang** and Yongyi Mao. "Sample-Conditioned Hypothesis Stability Sharpens Information-Theoretic Generalization Bounds." *Advances in Neural Information Processing Systems (NeurIPS)*, 2023.
- C4 **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**).
- C5 Zixuan Liu\*, **Ziqiao Wang**\*, Hongyu Guo and Yongyi Mao. "Over-Training with Mixup May Hurt Generalization." *International Conference on Learning Representations (ICLR)*, 2023.
- C6 **Ziqiao Wang** and Yongyi Mao. "Information-Theoretic Analysis of Unsupervised Domain Adaptation." *International Conference on Learning Representations (ICLR)*, 2023.
- C7 **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. "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*.
- W2 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 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)

## 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 (IMA) 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

- Conference Reviewer** NeurIPS (2023 - ), ICML (2024 - ), ICLR (2024 - ), AISTATS (2024 - ), IJCAI (2024 - ), ISIT (2024 - ), Neural Compression Workshop at ICML 2023
- Journal Reviewer** IEEE Transactions on Information Theory (TIT), IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), IEEE Journal on Selected Areas in Information Theory (JSAIT)
- Organizers** 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)