

Ziqiao Wang

Curriculum Vitae

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📄 <https://ziqiaowanggeothe.github.io>

Education

- 2019–present **Ph.D, University of Ottawa, Ottawa, Ontario, Canada**, (Expected Dec. 2023).
Electrical and Computer Engineering
Thesis: “Exploring Generalization in Machine Learning through Information-Theoretic Lens”
Advisor: Prof. Yongyi Mao
- 2017–2018 **M.A.Sc, University of Ottawa, Ottawa, Ontario, Canada**.
Electrical and Computer Engineering
Advisor: Prof. Yongyi Mao
- 2013–2017 **B.Eng, North China Electric Power University (NCEPU), Baoding, Hebei, China**.
Electrical Engineering and its Automation
Advisor: Prof. Xiangyu Zhang

Research Interests

- **Area:** Machine Learning, Statistical Learning Theory, Information Theory
- **Topics:** Generalization in Machine Learning/Deep Learning, Domain Adaptation

Employment

- 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.

- Conference C1 **Ziqiao Wang** and Yongyi Mao. “Tighter Information-Theoretic Generalization Bounds from Supersamples.” *International Conference on Machine Learning (ICML), 2023 (Oral Presentation, top 2.5% of submissions)*.
- C2 Zixuan Liu*, **Ziqiao Wang***, Hongyu Guo and Yongyi Mao. “Over-Training with Mixup May Hurt Generalization.” *International Conference on Learning Representations (ICLR), 2023*.
- C3 **Ziqiao Wang** and Yongyi Mao. “Information-Theoretic Analysis of Unsupervised Domain Adaptation.” *International Conference on Learning Representations (ICLR), 2023*.
- C4 **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 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*.

- Preprints P1 **Ziqiao Wang** and Yongyi Mao. "Sample-Conditioned Hypothesis Stability Sharpens Information-Theoretic Generalization Bounds." *Submitted to NeurIPS 2023*.
- P2 Fanshuang Kong, Richong Zhang, **Ziqiao Wang** and Yongyi Mao. "PromptMix: Mixup on Soft Prompt Tuning Embedding for Unsupervised Domain Adaptation ." *Submitted to AAAI 2024*.
- P3 **Ziqiao Wang** and Yongyi Mao. " f -Divergence Guided Unsupervised Domain Adaptation: Two Theoretical Viewpoints." *In Submission*.
- P4 **Ziqiao Wang** and Yongyi Mao. "Two Facets of SDE Under an Information-Theoretic Lens: Generalization of SGD via Training Trajectories and via Terminal States." *arXiv preprint arXiv:2211.10691 (2022). In Submission*.
- P5 **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*.

Honors & Awards

- 2023 ICLR Travel Award (1,000 USD)
- 2022-now INTER-MATH-AI Fellowship from the NSERC CREATE program (20,000 CAD/Year)
- 2021-now Doctorate Admission Scholarship from University of Ottawa (9,000 CAD/Year)
- 2019-now International Doctoral Scholarship from University of Ottawa (10,488 CAD/Year)
- 2016 Merit Student of NCEPU
First-class Scholarship from NCEPU (3,000 RMB)
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 **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*
- 2021-2022 **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*

2019 **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*

Professional Service

Conference Reviewer: NeurIPS, ICML

Journal Reviewer: IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)

Program Committee: The 2024 IEEE North American School of Information Theory (NASIT)

Teaching Experience

2018– 2022 **Teaching Assistant**, *University of Ottawa*.

CSI 5138/5340[R00] Introduction to Deep Learning and Reinforcement Learning (2018-2019, 2021-2022)

ELG 5170[A00] Information Theory (2020)

GNG 1106[A00] Fundamentals of Engineering Computation (2020-2021)