

# Guangji Bai (He/Him/His)

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## Research Statement

I am a fourth-year Ph.D. student at CS Department, Emory University working with Prof. [Liang Zhao](#). I am generally interested in designing **efficient, generalizable, and explainable learning algorithms with theoretical guarantee**. Specifically, my current research topics include but are not limited to **1.** Designing learning strategies for domain transfer problems, such as multi-task learning, domain adaptation, and domain generalization. **2.** Developing large-scale optimization algorithms with better scalability and performance, such as distributed training for Graph Neural Networks (GNNs) and inference acceleration of Large Language Models (LLMs). **3.** Online learning such as continual/lifelong learning with memory replay and neuro-inspiration.

## Education

<b>Emory University</b>	<b>Atlanta, GA</b>
Ph.D. in Computer Science	2020.8-2025.5 (expected)
<b>The George Washington University</b>	<b>Washington D.C.</b>
M.S. in Statistics	2018.9-2020.5
<b>Fudan University</b>	<b>Shanghai, China</b>
B.S. in Mathematics	2014.9-2018.6

## Research Experiences

<b>Department of Computer Science, Emory University</b>	<b>Atlanta, GA</b>
Graduate Research Assistant	2020.8-Present
<ul style="list-style-type: none"><li>Leading research projects on various topics of machine learning, such as multi-task learning, continual learning, and domain generalization, under the supervision of Dr. Liang Zhao. Having published first-author papers at top-tier conferences such as ICLR, KDD, SDM, etc.</li><li>Collaborating with industry and academia labs on large-scale machine learning tasks such as distributed Graph Neural Networks training, model compression for large language models (LLMs).</li><li>Providing theoretical analyses and mathematical proofs (e.g., generalization error bound, convergence analysis) for several research projects on deep learning.</li></ul>	

## Internship

<b>NEC Laboratory America</b>	<b>Princeton, NJ.</b>
Data Science and System Security Team	2023.5-2023.8
<ul style="list-style-type: none"><li>Developing machine learning algorithms for domain adaptation on time series data.</li><li>We generalize the prompt tuning techniques from NLP to time series domain and leverage the prompts to learn domain-specific and domain-invariant representation.</li><li>Proposed method demonstrated state-of-the-art performance on various time series domain adaptation benchmarks.</li></ul>	
<b>China Financial Futures Exchange</b>	<b>Shanghai, China</b>
IT Department	2017.7-2017.9
<ul style="list-style-type: none"><li>Developing the data platform for daily overview of global financial market.</li></ul>	

## Skills

- Programming: Java-intermediate, Python-proficient, PyTorch-proficient
- English-Proficiency
- Chinese – Native proficiency

## Selected Publications

- Guangji Bai**, Qilong Zhao, Xiaoyang Jiang, Liang Zhao. “Saliency-Guided Hidden Associative Replay for Continual Learning”. (*NeurIPS 2023@AMHN WS*)
- Guangji Bai**, Chen Ling\*, Liang Zhao. “Temporal Domain Generalization with Drift-Aware Dynamic Neural Networks”. (*ICLR 2023, Oral*).

- **Guangji Bai**, Chen Ling, Yuyang Gao, Liang Zhao. “Saliency-Augmented Memory Completion for Continual Learning.” SIAM International Conference on Data Mining (*SDM 2023*)
- **Guangji Bai**, Johnny Torres\*, Junxiang Wang, Liang Zhao, Carmen Vaca, Cristina Abad. “Sign-Regularized Multi-Task Learning.” SIAM International Conference on Data Mining (*SDM 2023*)
- **Guangji Bai**, Liang Zhao. “Saliency-Regularized Deep Multi-Task Learning.” The 28th ACM SIGKDD Conference on Knowledge Discovery and Data Mining (*KDD 2022*)
- Yuyang Gao, Tong Sun, **Guangji Bai**, Siyi Gu, Sungsoo Hong, Liang Zhao. “RES: A Robust Framework for Guiding Visual Explanation.” The 28th ACM SIGKDD Conference on Knowledge Discovery and Data Mining (*KDD 2022*)
- Zishan Gu, Ke Zhang, **Guangji Bai**, Liang Chen, Liang Zhao, Carl Yang. “Dynamic Activation of Clients and Parameters for Federated Learning over Heterogeneous Graphs.” The 31st ACM Conference on Information and Knowledge Management (*ICDE 2023*).
- Dazhou Yu\*, **Guangji Bai**\*, Yun Li, Liang Zhao. “Deep Spatial Domain Generalization”. The 22nd IEEE International Conference on Data Mining (*ICDM 2022*).

\*Equal contribution

For a comprehensive list of my research and publication, please refer to my [Google Scholar](#) page.

### **Selected Preprints**

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- **Resource-efficient Large Language Model (Survey Paper)**: We delve into various strategies and techniques for optimizing Large Language Models across key resources like computation, memory, energy, and financial costs. The survey highlights innovations in model architecture, training efficiency, and system design, offering insights into balancing model performance with resource constraints in AI research.
- **Large pre-trained model with prompting for time-series domain adaptation**: We investigate how to leverage pre-trained time-series model and prompt-tuning methods to achieve better performance on time-series domain adaptation tasks. We innovatively consider leveraging soft prompts to learn the domain-invariant and -specific information.
- **Inference acceleration of LLMs (ongoing project)**: explore gradient-free optimization methods and try to obtain a better trade-off between performance and efficiency of pruning LLMs.

### **Professional Services**

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PC member for NeurIPS (22'23'), AISTATS (23'24').

Reviewer for KDD, ICML, AAAI, ICDM, ICLR.

### **Awards**

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- ICLR 2023 oral (top 5% among accepted papers)
- SDM 2023 student travel award
- KDD 2022 student travel award
- CIKM 2022 student travel award