

# Yiwei ZHAO | 赵奕炜

## Curriculum Vitae

Carnegie Mellon University

Office: 41D7 Collaborative Innovation Center, 4720 Forbes Ave, Pittsburgh, PA, 15213

Email: [yiweiz3@andrew.cmu.edu](mailto:yiweiz3@andrew.cmu.edu) / [yiweizhao@cmu.edu](mailto:yiweizhao@cmu.edu) | Website: <https://zhaoyw007.github.io/>

Last modified in January 2025

## RESEARCH INTERESTS

Inter-discipline of: Computer System/Architecture<sup>1</sup> + Algorithm Engineering<sup>2</sup>

<sup>1</sup> System/Architecture: Parallel & Distributed Computing; Heterogeneous-Memory Systems.

<sup>2</sup> Algorithm Engineering: Algorithms & System Engineering for Prevalent Workloads in Databases & MLSys.

## EDUCATION

**Carnegie Mellon University**, Pittsburgh, Pennsylvania, 2021-present.

- Ph.D. candidate.
- Primary Advisor: Prof. Phillip B. Gibbons.

**Tsinghua University**, Beijing, China, 2017-2021.

- B.E. in Electronic Engineering. Graduated with highest honor.
- Double major in Economics & Finance.
- **Overall GPA:** 4.0/4.0                      **Ranking:** Top 3%

## HONORS & AWARDS

- Michel and Kathy Doreau Graduate Fellowship (2024 - present).
- Lee-Stanziale Ohana Fellowship (2023 - 2024).
- Qualcomm PhD Fellowship Finalist (2024).
- Best Paper Runner-up, VLDB (2023) [3].
- IBM PhD Fellowship Finalist (2023).
- Carnegie Mellon Institute of Technology Dean's Fellow (2021 - 2022).
- Honored Graduate, Tsinghua University & Beijing (2021).
- Tsinghua University Fellowship for Undergrads (2017 - 2021).
- Shuping Fellowship for Undergrads (2017 - 2021).
- China National Fellowship for Undergrads (2018 - 2020).

## RESEARCH EXPERIENCE

**Carnegie Mellon University (Graduate Research Assistant)**, Pittsburgh, PA, August 2021 – present.

- Advisor: Phillip B. Gibbons.
- Research Topics: Processing-In-Memory; Database Index; Parallel Graph Processing; Parallel Algorithms and Data Structures; Computation Geometry; Vector Databases; Computer Architecture.

**Meta Reality Lab (Research Scientist Intern)**, Redmond, WA, May 2023 – November 2023.

- Host: Chiao Liu, Ziyun Li.
- Research Topic: Architecture & System Design for Edge Devices; Compute-in-memory.

**Massachusetts Institute of Technology (Research Assistant)**, Cambridge, MA, June 2020 – November 2020.

- Advisor: Julian Shun.
- Research Topic: Parallel Spatial Clustering Algorithms & Unsupervised Learning.

**Tsinghua University (Undergraduate Research Assistant)**, Beijing, China, September 2020 – June 2021.

- Advisor: Yongpan Liu.
- Research Topic: Error Tolerant Designs for ReRAM based Compute-In-Memory Neural Network Accelerators.

**Tsinghua University (Research Assistant)**, Beijing, China, January 2019 – Oct 2019.

- Advisor: Dan Pei.
- Research Topic: Fault Localization and Data Mining in Multi-dimensional Data.

**Tsinghua University (SRT Research Assistant)**, Beijing, China, October 2018 – June 2019.

- Advisor: Yuantao Gu.
- Research Topics: Optimization, Statistical Learning, Graph Filtering, Sparse recovery, and NLP.

## PUBLICATIONS

### In Preparation

**Yiwei Zhao**, Hongbo Kang, Yan Gu, Guy E. Blelloch, Laxman Dhulipala, Charles McGuffey, and Phillip B. Gibbons. 2025. [Under submission. Paper title and conference name omitted to keep anonymity. On optimal search trees on Processing-in-Memory.]

Hyoungjoo Kim, **Yiwei Zhao**, Andy Pavlo, and Phillip B. Gibbons. 2025. [Under submission. Paper title and conference name omitted to keep anonymity. On transactional (OLTP) database on emerging hardware.]

**Yiwei Zhao**, Hongbo Kang, Guy E. Blelloch, Yan Gu, Laxman Dhulipala, Charles McGuffey, and Phillip B. Gibbons. 2025. [In preparation. On efficient space-partitioning index on emerging hardware.]

**Yiwei Zhao**, Hongbo Kang, Charles McGuffey, and Phillip B. Gibbons. 2025. [In preparation. On efficient task-data orchestration on distributed-memory systems.]

### Full Publications

[1] **Yiwei Zhao**, Jinhui Chen, Sai Qian Zhang, Syed Shakib Sarwar, Kleber Hugo Stangherlin, Jorge Tomas Gomez, Jae Sun Seo, Phillip B. Gibbons, Barbara De Salvo, Chiao Liu, Ziyun Li. 2025. “**H4H: Hybrid Convolution-Transformer Architecture Search for NPU-CIM Heterogeneous Systems for AR/VR Applications**”. In Proceedings of the 30th Asia and South Pacific Design Automation Conference (ASPDAC '25). Association for Computing Machinery, New York, NY, USA, 1133–1141. <https://doi.org/10.1145/3658617.3697627>.

[2] Hongbo Kang, **Yiwei Zhao**, Guy E. Blelloch, Laxman Dhulipala, Yan Gu, Charles McGuffey, and Phillip B. Gibbons. 2023. “**PIM-trie: A Skew-Resistant Trie for Processing-in-Memory**”. In Proceedings of the 35th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA '23). Association for Computing Machinery, New York, NY, USA, pp. 1–14. [doi:10.1145/3558481.3591070](https://doi.org/10.1145/3558481.3591070).

[3] Hongbo Kang, **Yiwei Zhao**, Guy E. Blelloch, Laxman Dhulipala, Yan Gu, Charles McGuffey, and Phillip B. Gibbons. 2022. “**PIM-tree: A Skew-resistant Index for Processing-in-Memory**”. In Proceedings of the VLDB Endowment (PVLDB), 16(4): 946–958, December 2022. [doi:10.14778/3574245.3574275](https://doi.org/10.14778/3574245.3574275). [arXiv:2211.10516](https://arxiv.org/abs/2211.10516). *Best Research Paper Runner-up in VLDB 2023*.

[4] Zeyan Li, Junjie Chen, Yihao Chen, Chengyang Luo, **Yiwei Zhao**, Yongqian Sun, Kaixin Sui, Xiping Wang, Dapeng Liu, Xing Jin, Qi Wang, and Dan Pei. 2023. “**Generic and Robust Root Cause Localization for Multi-Dimensional Data in Online Service Systems**”. In Journal of Systems and Software (JSS), Vol. 203, (2023), 111748. [doi:10.1016/j.jss.2023.111748](https://doi.org/10.1016/j.jss.2023.111748).

[5] Zeyan Li, Chengyang Luo, **Yiwei Zhao**, Yongqian Sun, Kaixin Sui, Xiping Wang, Dapeng Liu, Xing Jin, Qi Wang, and Dan Pei. 2019. “**Generic and Robust Localization of Multi-Dimensional Root Cause**”. In the 30th International Symposium on Software Reliability Engineering (**ISSRE '19**). Oct. 28-31, 2019, Berlin. [doi:10.1109/ISSRE.2019.00015](https://doi.org/10.1109/ISSRE.2019.00015).

### **Short Publications**

[6] **Yiwei Zhao**, Ziyun Li, Win-San Khwa, Xiaoyu Sun, Sai Qian Zhang, Syed Shakib Sarwar, Kleber Hugo Stangherlin, Yi-Lun Lu, Jorge Tomas Gomez, Jae Sun Seo, Phillip B. Gibbons, Barbara De Salvo, Chiao Liu. 2024. “**Neural Architecture Search of Hybrid Models for NPU-CIM Heterogeneous AR/VR Devices**”. In 61th ACM/IEEE Design Automation Conference (**DAC '24**), Poster Session, San Francisco, CA, USA, 2024. [arXiv:2410.08326](https://arxiv.org/abs/2410.08326).

[7] Hongbo Kang, **Yiwei Zhao**, Guy E. Blelloch, Laxman Dhulipala, Yan Gu, Charles McGuffey, and Phillip B. Gibbons. 2023. “**PIM-tree: A Skew-resistant Index for Processing-in-Memory (Abstract)**”. In Proceedings of the 2023 ACM Workshop on Highlights of Parallel Computing (**HOPC '23**), June 16, 2023, Orlando, FL, USA. [doi:10.1145/3597635.3598029](https://doi.org/10.1145/3597635.3598029).

## **TEACHING EXPERIENCES**

- **18-751 Applied Stochastic Processes, with Applications to AI/ML**: Teaching Assistant, Fall 2024, CMU.
- **18-742 Computer Architecture and Systems**: Teaching Assistant, Spring 2024, CMU.

## **SERVICES**

- **ACM Symposium on Parallelism in Algorithms and Architectures (SPAA'25)**: Junior Program Committee.
- **Student Council for Departmental Faculty Hiring**: Chair, Jan 2024 – present, CMU.
- **Student Council for Departmental Faculty Hiring**: Member, Jan 2023 – Jan 2024, CMU.

## **SKILLS**

- **Programming Languages**: C/C++, Java, Python, Shell Scripting, and Assembly.
- **Software Development Tools**: MATLAB, Git, SQL, and R.
- **Hardware Design Tools**: Verilog (HDL), Gem5, McPAT, ZSim, Multisim, and ADS.
- **Machine Learning Frameworks**: TensorFlow, PyTorch, and CUDA.
- **Other Software Tools**: Mathematica, Latex, AutoCAD, and Stata.