Weijian Zheng

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Research Interests:

Parallel Algorithms Design, Parallel Machine Learning, High-Performance Computing,
Distributed Systems, LLMs, AI4Science.

Professional Experiences

Argonne National Laboratory Postdoc Appointee, Jan. 2023 - current	Lemont, IL, USA
Oak Ridge National Laboratory Research Assistant, Aug. 2018 - Dec. 2022	Oak Ridge, TN, USA
Oak Ridge National Laboratory Research Intern, May 2018 - Aug. 2018	Oak Ridge, TN, USA
Indiana U Purdue U Indianapolis Graduate Research Assistant, Aug. 2014 - Dec. 2022	Indianapolis, IN, USA
Ball State University Teaching Assistant, June 2013 - July 2013	Muncie, IN, USA

Education

Ph.D. in Computer Science, Purdue University, Dec. 2022	West Lafayette, IN, USA
B.S. in Computer Science (*Summa cum Laude*), Ball State University, July 2014	Muncie, IN, USA

Publications

1. Hanzhi Zhang, Sumera Anjum, Heng Fan, **Zheng, Weijian**, Yan Huang, and Yunhe Feng. Poly-FEVER: A multilingual fact verification benchmark for hallucination detection in large language models. *arXiv preprint arXiv:2503.16541*, 2025

2. Chengming Zhang, Xinheng Ding, Baixi Sun, Xiaodong Yu, **Zheng, Weijian**, Zhen Xie, and Dingwen Tao. GFormer: Accelerating large language models with optimized transformers on gaudi processors. *arXiv preprint arXiv:2412.19829*, 2024

3. **Zheng, Weijian**, Hemant Sharma, Ryan Chard, Peter Kenesei, Jun-Sang Park, Nicholas Schwarz, Antonino Miceli, Ian T Foster, and Rajkumar Kettimuthu. Model and data management for machine learning (M2ML): Integrating instruments, edge and hpc for accelerated machine learning. In *2024 IEEE International Conference on Big Data (BigData)*, pages 4275–4282. IEEE, 2024c

4. **Zheng, Weijian**, Jack Kordas, Tyler J Skluzacek, Raj Kettimuthu, and Ian Foster. Globus service enhancements for exascale applications and facilities. *The International Journal of High Performance Computing Applications*, 38(6):658–670, 2024a

5. **Zheng, Weijian**, J-S Park, Peter Kenesei, Ahsan Ali, Zhengchun Liu, Ian Foster, Nicholas Schwarz, Rajkumar Kettimuthu, Antonino Miceli, and Hemant Sharma. Rapid detection of rare events from in situ X-ray diffraction data using machine learning. *Journal of Applied Crystallography*, 57(4), 2024b

6. Kareem Shaik, Dali Wang, **Zheng, Weijian**, Qinglei Cao, Heng Fan, Peter Schwartz, and Yunhe Feng. S3LLM: Large scale scientific software understanding with llms using source, metadata, and document. In *International Conference on Computational Science*, pages 222–230. Springer, 2024

7. Shihui Song, Yafan Huang, Peng Jiang, Xiaodong Yu, **Zheng, Weijian**, Sheng Di, Qinglei Cao, Yunhe Feng, Zhen Xie, and Franck Cappello. Ceresz: Enabling and scaling error-bounded lossy compression on cerebras cs-2. In *Proceedings of the 33rd International Symposium on High-Performance Parallel and Distributed Computing*, pages 309–321, 2024

8. Jim Pruyne, Valerie Hayot-Sasson, **Zheng, Weijian**, Ryan Chard, Justin M Wozniak, Tekin Bicer, Kyle Chard, and Ian T Foster. Steering a fleet: Adaptation for large-scale, workflow-based experiments. *arXiv preprint arXiv:2403.06077*, 2024

9. Chengming Zhang, Baixi Sun, Xiaodong Yu, Zhen Xie, **Zheng, Weijian**, Kamil A Iskra, Pete Beckman, and Dingwen Tao. Benchmarking and in-depth performance study of large language models on habana gaudi processors. In *Proceedings of the SC'23 Workshops of the International Conference on High Performance Computing, Network, Storage, and Analysis*, pages 1759–1766, 2023

10. Aniket Tekawade, Viktor Nikitin, Yashas Satapathy, Zhengchun Liu, Xuan Zhang, Peter Kenesei, **Zheng, Weijian**, Francesco De Carlo, Ian Foster, and Rajkumar Kettimuthu. Tomo2Mesh: Fast porosity mapping and visualization for synchrotron tomography. In *2023 IEEE 19th International Conference on e-Science (e-Science)*, pages 1–10. IEEE, 2023

11. Yunhe Feng, Sreecharan Vanam, Manasa Cherukupally, **Zheng, Weijian**, Meikang Qiu, and Haihua Chen. Investigating code generation performance of chat-gpt with crowdsourcing social data. In *Proceedings of the 47th IEEE Computer Software and Applications Conference*, pages 1–10, 2023

12. **Zheng, Weijian**, Dali Wang, and Fengguang Song. *A Distributed-GPU Deep Reinforcement Learning System for Solving Large Graph Optimization Problems. ACM Transactions on Parallel Computing*, 2023

13. Dali Wang, Peter Schwartz, Fengming Yuan, Peter Thornton, and **Zheng, Weijian**. *Towards Ultra-high-resolution E3SM Land Modeling on Exascale Computers. Computing in Science & Engineering*, 2022

14. Jian Zhou, **Zheng, Weijian**, Dali Wang, and David W Coit. *A resilient network recovery framework against cascading failures with deep graph learning. Proceedings of the Institution of Mechanical Engineers, Part O: Journal of Risk and Reliability*, page 1748006X221128869, 2022

15. **Zheng, Weijian**, Dali Wang, and Fengguang Song. *Designing a parallel Feel-the-Way clustering algorithm on HPC systems. The International Journal of High Performance Computing Applications (IJHPCA)*, 35(2): 154–169, 2021.

16. **Zheng, Weijian**, Dali Wang, and Fengguang Song. *OpenGraphGym: A parallel reinforcement learning framework for graph optimization problems*. In *International Conference on Computational Science (ICCS)*, pages 439–452. Springer, 2020.

17. **Zheng, Weijian**, Dali Wang, and Fengguang Song. *FQL: An extensible feature query language and toolkit on searching software characteristics for HPC applications*. In *Tools and Techniques for High Performance Computing (SE-HER)*, pages 129–142. Springer, 2019b.

18. **Zheng, Weijian**, Dali Wang, and Fengguang Song. *XScan: An Integrated Tool for Understanding Open Source Community-Based Scientific Code*. In *International Conference on Computational Science (ICCS)*, pages 226–237. Springer, 2019a.

19. **Zheng, Weijian**, Fengguang Song, Lan Lin, and Zizhong Chen. *Scaling Up Parallel Computation of Tiled QR Factorizations by a Distributed Scheduling Runtime System and Analytical Modeling. Parallel Processing Letters (PPL)*, 28(01):1850004, 2018.

20. Dali Wang, **Zheng, Weijian**, and Fengguang Song. *Application Software Analytics Toolkit for Facilitating the Understanding, Componentization, and Refactoring of Large-Scale Scientific Models.* Technical report, Oak Ridge National Lab.(ORNL), Oak Ridge, TN (United States), 2018.

21. **Zheng, Weijian**, Fengguang Song, and Lan Lin. *Designing a Synchronization-reducing Clustering Method on Manycores: Some Issues and Improvements.* In *Proceedings of the Machine Learning on HPC Environments (MLHPC)*, page 9. ACM, 2017.

22. **Zheng, Weijian**, Fengguang Song, Lan Lin, and Zizhong Chen. *suCAQR: A Simplified Communication-Avoiding QR Factorization Solver Using the TBLAS Framework.* In *2016 IEEE 22nd International Conference on Parallel and Distributed Systems (ICPADS)*, pages 1092–1099. IEEE, 2016.

Grants and Awards

Grant Awards

"Towards Fast Quantitative Regression Analysis with Vision Transformers and Bayesian Neural Networks.": Argonne Laboratory Directed Research & Development (LDRD) SEED funding, 2024, 25,000$, Role: Sole PI

Computing Resource Awards

"Accelerating 3D Tomography Analysis with High-Performance Computing.": ALCF Director's Discretionary Allocation, Argonne National Laboratory, 2025, 3,000 node-hours on Aurora Supercomputer, Role: PI

"Co-optimize AI Algorithm and Computer System for Accelerating High-resolution Image Generation.": ALCF Director's Discretionary Allocation, Argonne National Laboratory, 2024, 3,000 node-hours on Polaris and Sophia Supercomputer, Role: PI

"Advanced Applications and Performance Benchmarking of the Cerebras CS-2 in High-Volume Image Processing and Computational Analysis.": NSF-funded ACCESS Allocation at Pittsburgh Supercomputing Center (PSC) 2024, 400,000 ACCESS credits on Neocortex, Role: PI

"Evaluation of NAS for X-ray applications on next generation AI hardware.": ALCF Director's Discretionary Allocation, Argonne National Laboratory, 2024, AI-testbed (Cerebras, Graphcore, and SambaNova), Role: PI

Professional Activities

Conferences Program Committee Members and Reviewers

TPC for IEEE International Conference on Distributed Computing Systems (ICDCS), 2025

PC Member for International Conference on Dependable Systems and Networks (DSN), 2025

Reviewer for ACM International Conference on Knowledge Discovery and Data Mining (KDD), 2025

Reviewer for IEEE International Conference on Cloud Computing (CLOUD), 2024, 2025

Reviewer for ACM International Conference on Supercomputing (ICS), 2025

Reviewer for IEEE Intl. Conf. on Advanced Networks and Telecommunications Systems (ANT), 2024

Reviewer for International Conference on Parallel Processing (ICPP), 2024

Reviewer for European Conference on Parallel Processing (Euro-Par), 2024, 25

Reviewer for IEEE Intl. Symposium on Cluster, Cloud, and Internet Computing (CCGRID), 2023

Journal Reviewers

Reviewer for Information Sciences

Reviewer for IEEE Transactions on Systems, Man, and Cybernetics: Systems

Reviewer for IEEE Transactions on Big Data
Reviewer for IEEE Network Magazine
Reviewer for IEEE Internet of Things Journal
Reviewer for Journal of Signal Processing Systems
Reviewer for Digital Communications and Networks

Recent Talks and Presentations

"AI-Driven Approaches for X-ray Diffraction: Rapid Plastic Deformation Detection and Scalable ML Infrastructure", invited talk at the APS Scientific Computation Seminar Series at Argonne, Mar. 25, Online

"Model and Data Management for Machine Learning (M2ML): Integrating Instruments, Edge and HPC for Accelerated Machine Learning", presentation at the 5th International Workshop on Big Data & AI Tools, Models, and Use Cases for Innovative Scientific Discovery (BTSD) at IEEE BigData 24, Dec. 24, Washington DC, USA

"Model and Data Management for Machine Learning (M2ML): Integrating Instruments, Edge and HPC for Accelerated Machine Learning", presentation at the XLOOP workshop at SC 24, Nov. 24, Atlanta, GA, USA

"Rapid Detection of Rare Events From In Situ X-ray Diffraction Data Using Machine Learning", invited talk at the Diffraction-based Microstructure Imaging Workshop at the APS / CNM Users Meeting 2024, May. 24, Lemont, IL, USA

"Anomaly Detection for High Energy Diffraction Methods (HEDM) and the Coordination between Experiment and HPC Facilities", invited talk at the Research Experiences for Undergraduates (REU) site named BigDataX: From theory to practice in Big Data computing at eXtreme scales, July. 24, Lemont, IL, USA

"HPC Accelerates", guest lecture at the University of North Texas (UNT), Mar. 23, Denton, TX, USA

"Scalable Parallel Machine Learning on High-Performance Computing Systems - Clustering and Reinforcement Learning", invited talk at the CS Seminar Series at the Argonne National Laboratory, Mar. 23, Lemont, IL, USA

Last updated: April 22, 2025