

Jinyang Liu

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EDUCATION	Ph.D. in Computer Science University of California, Riverside, CA M.S. in Data Science Peking University, Beijing, China B.S. in Mathematics and Applied Mathematics Peking University, Beijing, China	<i>September 2019–Present</i> <i>September 2016–July 2019</i> <i>September 2011–July 2016</i>
RESEARCH INTEREST	High Performance Computing Scientific Data Management, Analysis, and Reduction Deep Learning in High Performance Computing and Data Compression AI for Science	
WORK EXPERIENCE	Research Intern , Extreme Scale Resilience Group, Argonne National Laboratory, Lemont, IL, <i>May 2020–Present</i> Graduate Student Researcher , Supercomputing Laboratory, University of California, Riverside, Riverside, CA, <i>September 2019–Present</i>	
HONOURS AND AWARDS	<ul style="list-style-type: none">• Best Paper Finalist in International Conference on Supercomputing 2023 (ICS '23).• Dissertation Year Program Fellowship, University of California, Riverside.• 2021 R&D 100 Award (SZ compression framework).• Outstanding Graduate Student, Peking University.• Outstanding Research Award, Peking University.	2023 2023 2021 2019 2018
PROJECTS PARTICIPATED	<ul style="list-style-type: none">• NSF CSSI ROCCI: <i>Integrated Cyberinfrastructure for In Situ Lossy Compression Optimization Based on Post Hoc Analysis Requirements</i>• DOE ASCR SDR: <i>Scalable Dynamic Scientific Data Reduction</i>• NSF CDS&E HyLoC: <i>Objective-driven Adaptive Hybrid Lossy Compression Framework for Extreme-Scale Scientific Application</i>• ECP VeloC/SZ: <i>Ensuring high reliability for long-running exascale simulations and reducing the data while keeping important scientific outcomes intact</i>• ARAMCO: <i>Exploration of Lossy Data Compression for Seismic Imaging Application</i>	
REFEREED CONFERENCE PUBLICATIONS	<ul style="list-style-type: none">• [SIGMOD '24] Jinyang Liu, Sheng Di, Kai Zhao, Xin Liang, Sian Jin, Zizhe Jian, Jiajun Huang, Shixun Wu, Zizhong Chen, and Franck Cappello. 2023. "High-performance Effective Scientific Error-bounded Lossy Compression with Auto-tuned Multi-component Interpolation."• [ICS '23 (Best Paper Finalist)] Jinyang Liu, Sheng Di, Kai Zhao, Xin Liang, Zizhong Chen, and Franck Cappello. "FAZ: A flexible auto-tuned modular error-bounded compression framework for scientific data." In <i>Proceedings of the 37th International Conference on Supercomputing</i>, pp. 1-13. 2023.• [SC '22] Jinyang Liu, Sheng Di, Sian Jin, Kai Zhao, Xin Liang, Zizhong Chen, and Franck Cappello. "Dynamic quality metric oriented error bounded lossy compression for scientific datasets." In <i>SC22: International Conference for High Performance Computing, Networking, Storage and Analysis</i>, pp. 1-15. IEEE, 2022.• [BigData '23] Jinyang Liu, Sheng Di, Kai Zhao, Xin Liang, Zizhong Chen, and Franck Cappello. "Scientific Error-bounded Lossy Compression with Super-resolution Neural Networks." In <i>2023 IEEE International Conference on Big Data (BigData)</i>, pp. 229-236. IEEE Computer Society, 2023.• [Cluster '21] Jinyang Liu, Sheng Di, Kai Zhao, Sian Jin, Dingwen Tao, Xin Liang, Zizhong Chen, and Franck Cappello. "Exploring autoencoder-based error-bounded compression for sci-	

entific data.” In *2021 IEEE International Conference on Cluster Computing (CLUSTER)*, pp. 294-306. IEEE, 2021.

- [BigData ’21] **Jinyang Liu**, Sihuan Li, Sheng Di, Xin Liang, Kai Zhao, Dingwen Tao, Zizhong Chen, and Franck Cappello. ”Improving lossy compression for SZ by exploring the best-fit lossless compression techniques.” In *2021 IEEE International Conference on Big Data (Big Data)*, pp. 2986-2991. IEEE, 2021.
- [IPDPS ’24] Zizhe Jian, Sheng Di, **Jinyang Liu**, Kai Zhao, Xin Liang, Haiying Xu, Robert Underwood, Shixun Wu, Jiajun Huang, Zizhong Chen, and Franck Cappello. ”CliZ: Optimizing Lossy Compression for Climate Datasets with Adaptive Fine-tuned Data Prediction.”
- [IPDPS ’24] Jiajun Huang, Sheng Di, Xiaodong Yu, Yujia Zhai, Zhaorui Zhang, **Jinyang Liu**, Xiaoyi Lu, Ken Raffanetti, Hui Zhou, Kai Zhao, Zizhong Chen, Franck Cappello, Yanfei Guo, and Rajeev Thakur. ”An Optimized Error-controlled MPI Collective Framework Integrated with Lossy Compression.”
- [ICDE ’24] Mingze Xia, Sheng Di, Franck Cappello, Pu Jiao, Kai Zhao, **Jinyang Liu**, Xuan Wu, Xin Liang, and Hanqi Guo. ”Preserving Topological Feature with Sign-of-Determinant Predicates in Lossy Compression: A Case Study of Vector Field Critical Points.”
- [HiPC ’23] Arham Khan, Sheng Di, Kai Zhao, **Jinyang Liu**, Kyle Chard, Ian Foster, and Franck Cappello. ”SECRE: Surrogate-based Error-controlled Lossy Compression Ratio Estimation Framework.”
- [HiPC ’23] Pu Jiao, Sheng Di, **Jinyang Liu**, Xin Liang, and Franck Cappello. ”Characterization and Detection of Artifacts for Error-controlled Lossy Compressors.”
- [ICS ’23] Shixun Wu, Yujia Zhai, **Jinyang Liu**, Jiajun Huang, Zizhe Jian, Bryan Wong, and Zizhong Chen. ”Anatomy of High-Performance GEMM with Online Fault Tolerance on GPUs.” In *Proceedings of the 37th International Conference on Supercomputing*, pp. 360-372. 2023.
- [Cluster ’23] Jiajun Huang, Kaiming Ouyang, Yujia Zhai, **Jinyang Liu**, Min Si, Ken Raffanetti, Hui Zhou, Atsushi Hori, Zizhong Chen, Yanfei Guo, and Rajeev Thakur. PiP-MColl: Process-in-Process-based Multi-object MPI Collectives.
- [BigData ’23] Kaiming Ouyang, Vincent Tran, **Jinyang Liu**, Bryan M. Wong, and Zizhong Chen. ”KF K-means: A High Performance K-means Implementation using Kernel Fusion.”
- [ICS ’21] Yujia Zhai, Elisabeth Gien, Quan Fan, Kai Zhao, **Jinyang Liu**, and Zizhong Chen. ”FT-BLAS: a high performance BLAS implementation with online fault tolerance.” In *Proceedings of the ACM International Conference on Supercomputing*, pp. 127-138. 2021.
- [FAIML ’19] Shuai Wang*, **Jinyang Liu***, Ye Qiu, Zhiyi Ma, Junfei Liu, and Zhonghai Wu. ”Deep learning based code completion models for programming codes.” In *Proceedings of the 2019 3rd International Symposium on Computer Science and Intelligent Control*, pp. 1-9. 2019. (*: Co-first authors)
- [ICCSE ’19] **Jinyang Liu**, Ye Qiu, Zhiyi Ma, and Zhonghai Wu. ”Autoencoder based API recommendation system for Android programming.” In *2019 14th International Conference on Computer Science Education (ICCSE)*, pp. 273-277. IEEE, 2019.

UNDER-REVIEW CONFERENCE PAPERS

- [TBD] **Jinyang Liu***, Jiannan Tian*, Shixun Wu*, Sheng Di, Boyuan Zhang, Yafan Huang, Kai Zhao, Guanpeng Li, Dingwen Tao, Zizhong Chen, and Franck Cappello. ”cuSZ-I: High-Fidelity Error-Bounded Lossy Compression for Scientific Data on GPUs.” (*: Co-first authors)
- [Submitted to IPDPS ’24] Zizhe Jian, Sheng Di, **Jinyang Liu**, Kai Zhao, Xin Liang, Haiying Xu, Robert Underwood, Shixun Wu, Zizhong Chen, and Franck Cappello. ”CliZ: Optimizing Lossy Compression for Climate Datasets with Adaptive Fine-tuned Data Prediction.”
- [Submitted to IPDPS ’24] Jiajun Huang, Sheng Di, Xiaodong Yu, Yujia Zhai, Zhaorui Zhang, **Jinyang Liu**, Xiaoyi Lu, Ken Raffanetti, Hui Zhou, Kai Zhao, Zizhong Chen, Franck Cappello, Yanfei Guo, and Rajeev Thakur. ”An Optimized Error-controlled MPI Collective Framework Integrated with Lossy Compression.”

REFEREED WORKSHOP PUBLICATIONS

- [IWBDR-4] Jiajun Huang, **Jinyang Liu**, Sheng Di, Yujia Zhai, Zizhe Jian, Shixun Wu, Kai Zhao, Zizhong Chen, Yanfei Guo, and Franck Cappello. ”Exploring Wavelet Transform Usages for Error-bounded Scientific Data Compression.” In *2023 IEEE International Conference on Big Data (BigData)*, pp. 4233-4239. IEEE, 2023.

REFEREED JOURNAL PUBLICATIONS

- [TPDS] Yujia Zhai, Elisabeth Gien, Kai Zhao, **Jinyang Liu**, Jiajun Huang, Bryan Wong, Christian Shelton, and Zizhong Chen, ”FT-BLAS: A Fault Tolerant High Performance BLAS Implementation on x86 CPUs.” *IEEE Transactions on Parallel and Distributed Systems*.

CONFERENCE POSTERS	<ul style="list-style-type: none"> • [Cluster '23] Arham Khan, Sheng Di, Kai Zhao, Jinyang Liu, Kyle Chard, Ian Foster, and Franck Cappello. "An Efficient and Accurate Compression Ratio Estimation Model for SZx." • [HPDC '23] Jiajun Huang, Kaiming Ouyang, Yujia Zhai, Jinyang Liu, Min Si, Ken Raffanetti, and Hui Zhou. "Accelerating MPI Collectives with Process-in-Process-based Multi-object Techniques." arXiv preprint arXiv:2305.10612 (2023).
SERVICES	<ul style="list-style-type: none"> • Programs Committee: IWBDR 2023. • Reviewers: IPDPS 2024, ICS 2023, DCC 2023, HDIS 2022, IWBDR 2022, ICMLA 2021.
TEACHING	<ul style="list-style-type: none"> • Teaching Assistant, CS211: High Performance Computing, University of California, Riverside, Riverside, CA, September–December, 2022. • Teaching Assistant, CS211: High Performance Computing, University of California, Riverside, Riverside, CA, September–December, 2021. • Teaching Assistant, CS160: Concurrent Programming and Parallel Systems, University of California, Riverside, Riverside, CA, January–March, 2021. • Teaching Assistant, CS211: High Performance Computing, University of California, Riverside, Riverside, CA, September–December, 2020.
TALKS AND PRESENTATIONS	<ul style="list-style-type: none"> • 2023/06, presentation, FAZ: A flexible auto-tuned modular error-bounded compression framework for scientific data, the 37th International Conference on Supercomputing, Orlando, FL, USA. • 2022/11, presentation, Dynamic quality metric oriented error bounded lossy compression for scientific datasets, SC22: International Conference for High Performance Computing, Networking, Storage and Analysis, Dallas, TX, USA. • 2021/12, presentation, 2021 IEEE International Conference on Big Data (Big Data), online. • 2021/09, presentation, 2021 IEEE International Conference on Cluster Computing (CLUSTER), online.
SOFTWARE DEVELOPED OR PARTICIPATED	<ul style="list-style-type: none"> • SZ3, https://github.com/szcompressor/SZ3, SZ3: A Modular Error-bounded Lossy Compression Framework for Scientific Datasets. • QoZ, https://github.com/szcompressor/QoZ, QoZ: Dynamic Quality Metric Oriented Error Bounded Lossy Compression for Scientific Datasets. • HPEZ, https://github.com/Meso272/HPEZ, HPEZ: High-performance Effective Scientific Error-bounded Lossy Compression with Auto-tuned Multi-component Interpolation.
REFERENCE	<p>Dr. Zizhong Chen Professor University of California, Riverside E-mail: chen@cs.ucr.edu</p> <p>Dr. Franck Cappello Senior Computer Scientist Argonne National Laboratory E-mail: cappello@mcs.anl.gov</p> <p>Dr. Sheng Di Computer Scientist Argonne National Laboratory E-mail: sdi1@anl.gov</p> <p>Dr. Rajiv Gupta Professor University of California, Riverside E-mail: rajivg@ucr.edu</p>