

PU JIAO

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Lexington, KY, United States

PROFESSIONAL SUMMARY

Experienced Software Engineer and Data Scientist with 5+ years in high-performance computing, data compression algorithms, and large-scale system optimization. Proven track record of developing production-ready solutions that improved data processing efficiency by 40-60%. Expert in C++, Python, and parallel computing frameworks with hands-on experience in cloud infrastructure and database management. Published researcher with 10+ peer-reviewed publications in top-tier venues.

EDUCATION

- **University of Kentucky** Lexington, KY
Ph.D. in Computer Science (Expected) May 2026
- **Missouri University of Science and Technology** Rolla, MO
M.S. in Civil Engineering 2021
- **Xi'an Jiaotong University** Xi'an, China
B.Eng. in Civil Engineering 2018

TECHNICAL SKILLS

- **Programming Languages:** C++ (Advanced), Python (Advanced), JavaScript, SQL, R, MATLAB
- **Frameworks & Libraries:** MPI, OpenMP, CUDA, NumPy, Pandas, SciPy, scikit-learn, TensorFlow
- **Cloud & Infrastructure:** AWS, Docker, Kubernetes, Linux/Unix systems, Git, CI/CD pipelines
- **Databases & Storage:** MongoDB, MySQL, SQLite, Redis, distributed storage systems
- **Tools & Technologies:** CMake, Spack, REST APIs, microservices, data compression algorithms
- **Specializations:** High-performance computing, algorithm optimization, data analytics, machine learning

PROFESSIONAL EXPERIENCE

- **University of Kentucky** Lexington, KY
Research Assistant Aug 2022 - Dec 2024
 - Developed and implemented artifact detection algorithms for scientific lossy compression systems, focusing on characterization and mitigation strategies for data decompression artifacts
 - Optimized interpolation-based compression algorithms through adaptive quantization techniques, achieving up to 90% improvement in compression ratio while maintaining data quality
 - Conducted comprehensive performance analysis of multiple lossy compressors (SZ2.1, SZ3, SZx, FPZIP, ZFP) for large-scale scientific datasets, establishing benchmarking standards
 - Designed and implemented detection methodologies for posterization, interpolation, and tiling artifacts in compressed scientific data using advanced signal processing techniques
 - Developed Python API interfaces for C++ compression libraries to enhance workflow efficiency and enable broader research community adoption
 - Collaborated with Argonne National Laboratory research teams on high-performance computing optimization projects and compression algorithm development
- *Teaching Assistant* Jan 2025 - Present
 - CS216: Introduction to Software Engineering Techniques - led lab sessions and provided student support
 - Received "Excellent" ratings across all teaching categories with 4.1-4.4/5 student evaluations
 - Guided students through programming assignments and held regular office hours for debugging assistance
- **Missouri University of Science and Technology** Rolla, MO
Research Assistant @ Computer Science Jan 2022 - Jul 2022
 - Developed Quantity of Interest (QoI) compression algorithms based on SZ3 compressor framework and conducted performance evaluations
 - Implemented benchmarking tools for lossy compression analysis using C++ and Python
- *Research Assistant @ Civil Engineering* Sep 2019 - Dec 2021
 - Used Computational Fluid Dynamics (CFD) to understand UAV ceiling effects under bridge decks, utilizing HandyScan 3D laser scanning and reverse engineering software to build propeller models for CFD simulation
 - Participated in bridge inspection and data preprocessing work using Flyability Elios, Skydio, Parrot Anafi, and FLIR thermal cameras
 - Collected earthquake records from PEER database, designed OpenSees models, and implemented parallel running of OpenSees instances using MATLAB

PUBLICATIONS

First-Author and Co-First-Author Publications:

1. [VLDB'25] Liu, Jinyang*, **Jiao, Pu***, Zhao, Kai, Liang, Xin, Di, Sheng, Cappello, Franck (2025). **QPET: A Versatile and Portable Quantity-of-Interest-Preservation Framework for Error-Bounded Lossy Compression**. *Proceedings of the VLDB Endowment*, Vol. 18. 2025. (To appear) (*Equal contribution)
2. [IPDPS'25] **Jiao, Pu**, Di, Sheng, Xia, Mingze, Wu, Xuan, Liu, Jinyang, Liang, Xin, Cappello, Franck (2025). **Improving the Efficiency of Interpolation-Based Scientific Data Compressors with Adaptive Quantization Index Prediction**. In *2025 IEEE International Parallel and Distributed Processing Symposium (IPDPS)*. IEEE. 2025. (To appear)
3. [HiPC'23] **Jiao, Pu**, Di, Sheng, Liu, Jinyang, Liang, Xin, Cappello, Franck (2023). **Characterization and Detection of Artifacts for Error-Controlled Lossy Compressors**. In *2023 IEEE 30th International Conference on High Performance Computing, Data, and Analytics (HiPC)*, pp. 117-126. IEEE. December 2023, Goa, India. DOI: 10.1109/HiPC58850.2023.00027
4. [VLDB'22] **Jiao, Pu**, Di, Sheng, Guo, Hanqi, Zhao, Kai, Tian, Jiannan, Tao, Dingwen, Liang, Xin, Cappello, Franck (2022). **Toward Quantity-of-Interest Preserving Lossy Compression for Scientific Data**. *Proceedings of the VLDB Endowment*, Vol. 16, Issue 4, pp. 697-710. DOI: 10.14778/3574245.3574264

Co-Author Publications:

1. [IPDPS'25] Wu, Xuan, Di, Sheng, Ren, Congrong, **Jiao, Pu**, Xia, Mingze, Wang, Cheng, Guo, Hanqi, Liang, Xin, Cappello, Franck (2025). **Enabling Efficient Error-controlled Lossy Compression for Unstructured Scientific Data**. In *2025 IEEE International Parallel and Distributed Processing Symposium (IPDPS)*. IEEE. 2025. (Best Paper)
2. [ICDE'25] Xia, Mingze, Wang, Bei, Li, Yuxiao, **Jiao, Pu**, Liang, Xin, Guo, Hanqi (2025). **TspSZ: An Efficient Parallel Error-Bounded Lossy Compressor for Topological Skeleton Preservation**. In *2025 IEEE 41st International Conference on Data Engineering (ICDE)*, pp. 3682-3695. IEEE. May 2025. DOI: 10.1109/ICDE65448.2025.00275
3. [ICDE'24] Xia, Mingze, Di, Sheng, Cappello, Franck, **Jiao, Pu**, Zhao, Kai, Liu, Jinyang, Wu, Xuan, Liang, Xin, Guo, Hanqi (2024). **Preserving Topological Feature with Sign-of-Determinant Predicates in Lossy Compression: A Case Study of Vector Field Critical Points**. In *2024 IEEE 40th International Conference on Data Engineering (ICDE)*, pp. 4979-4992. IEEE. May 2024. DOI: 10.1109/ICDE60146.2024.00378
4. Ma, Pengfei, Li, Jiaoli, Zhuo, Ying, **Jiao, Pu**, Chen, Genda (2023). **Coating Condition Detection and Assessment on the Steel Girder of a Bridge through Hyperspectral Imaging**. *Coatings*, Vol. 13, Issue 6, pp. 1008. DOI: 10.3390/coatings13061008
5. Yuan, Xinzhe, Chen, Genda, **Jiao, Pu**, Li, Liujun, Han, Jun, Zhang, Haibin (2022). **A neural network-based multivariate seismic classifier for simultaneous post-earthquake fragility estimation and damage classification**. *Engineering Structures*, Vol. 255, pp. 113918. DOI: 10.1016/j.engstruct.2022.113918
6. Yuan, Xinzhe, Tanksley, Dustin, **Jiao, Pu**, Li, Liujun, Chen, Genda, Wunsch, Donald (2021). **Encoding time-series ground motions as images for convolutional neural networks-based seismic damage evaluation**. *Frontiers in Built Environment*, Vol. 7, pp. 660103. DOI: 10.3389/fbuil.2021.660103

SERVICE

- **Conference Volunteer:** Student Volunteer, SC25 (The International Conference for High Performance Computing, Networking, Storage, and Analysis)
- **Reviewer:** IEEE Transactions on Parallel and Distributed Systems (TPDS)

ADDITIONAL INFORMATION

Languages: English (Fluent), Chinese (Native)

Open Source Contributions: Active contributor to SZ compression library, CMake best practices, and scientific computing tools

Professional Interests: Cloud computing, DevOps, machine learning infrastructure, data engineering