

# PU JIAO

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Lexington, KY, United States

## RESEARCH INTERESTS

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High-Performance Computing  
Scientific Data Management, Analysis, and Reduction  
Deep Learning in High-Performance Computing and Data Compression

## EDUCATION

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- **University of Kentucky** *Expected May 2026*  
Lexington, KY  
*Ph.D. in Computer Science*
- **Missouri University of Science and Technology** *May 2022*  
Rolla, MO  
*M.S. in Civil Engineering*
- **Institute of Engineering Mechanics, China Earthquake Administration** *May 2019*  
Harbin, China  
*M.Eng. in Structural Engineering*
- **Xi'an Jiaotong University** *June 2016*  
Xi'an, China  
*B.Eng. in Civil Engineering*

## ACADEMIC EXPERIENCE

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- **Argonne National Laboratory** *August 2022 - Present*  
Lemont, IL  
*Visiting Graduate Student*
  - Research on high-performance computing and data compression.
  - Collaborated with multi-institutional teams on scientific data management and analysis.
  - Developed novel algorithms for compression quality improvement.
- **University of Kentucky** *August 2022 - Present*  
Lexington, KY  
*Research Assistant*
  - Led research on artifact characterization and mitigation for error-controlled lossy compression, resulting in publications at VLDB, IPDPS, and ICDE.
  - Developed novel adaptive quantization algorithms and quantity-of-interest preservation frameworks for scientific data compression.
  - Collaborated with Argonne National Laboratory and multi-institutional teams on high-performance computing and compression optimization.
- **Missouri University of Science and Technology**  
*Research Assistant*
  - Computer Science Department (January 2022 - July 2022): Data compression.
  - Civil Engineering Department (September 2019 - December 2021): Research activities include UAV assisted bridge inspection, CFD Simulation, structural simulation.

## PUBLICATIONS

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1. [IPDPS'26] Jiao, Pu, Sheng Di, Jiannan Tian, Mingze Xia, Xuan Wu, Yang Zhang, Xin Liang, Franck Cappello. **Mitigating Artifacts in Pre-quantization Based Scientific Data Compressors with Quantization-aware Interpolation.**
2. [VLDB'25] Jinyang Liu\*, Pu Jiao\*, Kai Zhao, Xin Liang, Sheng Di, Franck Cappello, (2025). **QPET: A Versatile and Portable Quantity-of-Interest-Preservation Framework for Error-Bounded Lossy Compression.** *Proceedings of the VLDB Endowment*, Vol. 18. 2025. (\*Equal contribution)
3. [IPDPS'25] Pu Jiao, Sheng Di, Mingze Xia, Xuan Wu, Jinyang Liu, Xin Liang, Franck Cappello (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.
4. [IPDPS'25] Wu Xuan, Sheng Di, Ren Congrong, Pu Jiao, Mingze Xia, Cheng Wang, Hanqi Guo, Xin Liang, Franck Cappello (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 Award]**
5. [ICDE'25] Mingze Xia, Bei Wang, Yuxiao Li, Pu Jiao, Xin Liang, Hanqi Guo (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
6. [ICDE'24] Mingze Xia, Sheng Di, Franck Cappello, Pu Jiao, Kai Zhao, Jinyang Liu, Xuan Wu, Xin Liang, Handi Guo (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
7. [HiPC'23] Pu Jiao, Sheng Di, Jinyang Liu, Xin Liang, Franck Cappello (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
8. [VLDB'22] Pu Jiao, Sheng Di, Hanqi Guo, Kai Zhao, Jiannan Tian, Dingwen Tao, Xin Liang, Franck Cappello (2022). **Toward Quantity-of-Interest Preserving Lossy Compression for Scientific Data.** *Proceedings of the VLDB Endowment*, Vol. 16, Issue 4, pp. 697-710. DOI: 10.14778/3574245.3574264s
9. 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
10. 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
11. 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

## TEACHING EXPERIENCE

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• **University of Kentucky**  
Teaching Assistant, Computer Science Department

January 2025 - Present  
Lexington, KY

- **CS218: Advanced Programming and Operating System Interfaces, Fall 2025 and Spring 2026**
  - \* Guided students through programming assignments and held regular office hours.
  - \* Graded assignments promptly and participated in TA meetings.
- **CS216: Intro to Software Engineering Techniques, Spring 2025**
  - \* Led in-person lab sessions for two sections , guided students through programming assignments.
  - \* Received "Excellent" ratings and 4.1-4.4/5 student evaluations for clarity and debugging assistance.

## SERVICE

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- **Reviewer:** IEEE Transactions on Parallel and Distributed Systems, Frontiers of Computer Science.
- **Conference Volunteer:** Student Volunteer, SC24 and SC25

## AWARDS

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- **Best Paper Award, IPDPS 2025**
- **SC25 Travel Grant**
- **SC24 Travel Grant**

## SKILLS

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- **Programming Languages:** C++, Python, JavaScript, Java, SQL, R, MATLAB
- **High-Performance Computing:** MPI, OpenMP, CUDA, parallel algorithms, scientific computing
- **Build Systems & Tools:** CMake, Spack, Git, Linux/Unix systems
- **Data Science & Analysis:** NumPy, Pandas, SciPy, Matplotlib, scikit-learn
- **Databases:** MongoDB, MySQL, SQLite
- **Compression Technologies:** SZ2.1, SZ3, SZx, FPZIP, ZFP, lossy compression algorithms
- **Simulation Software:** OpenSees, CFD, ANSYS, structural analysis tools
- **Research Methodologies:** Algorithm design, performance optimization, artifact detection, experimental validation