DAOCE WANG

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EDUCATION

Indiana University, Bloomington, IN

2022 - 2025 PH.D. CANDIDATE in Computer Engineering ADVISORS: Dr. Fengguang Song and Dr. Dingwen Tao
Dissertation Proposal Defense Date: Aug 2024. Anticipated Date of Graduation: May 2025

Washington State University, Pullman, WA (transferred to Indiana University)

2020 - 2022 PH.D. CANDIDATE in Computer Science ADVISOR: Dr. Dingwen Tao

University of Florida, Gainesville, FL

2020 Master of Science in Computer Science

University of Electronic Science and Technology of China, Chengdu, China

2018 Bachelor of Science in Computer Science and Engineering

RESEARCH

Skills C/C++, MPI, OpenMP, CUDA, Python, MATLAB

Interests High-Performance Computing, Scientific Data Management, Lossy Compression, Scientific Visualization, Machine Learning, Fault Tolerance, Adaptive Mesh Refinement (AMR), Tensor Decomposition

PUBLICATION

PPoPP '25 Baixi Sun, Weijin Liu, J. Gregory Pauloski, Jiannan Tian, Jinda Jia, **Daoce Wang**, Mingkai Zheng, Sheng Di, Sian Jin, Zhao Zhang, Xiaodong Yu, Guangming Tan, and Dingwen Tao.
"COMPSO: Optimizing Gradient Compression for Distributed Training with Second-Order Optimizers" 30th ACM SIGPLAN Annual Symposium on Principles and Practice of Parallel Programming, Las Vegas, NV, USA, March 1–5, 2025.

NeurIPS '24 Jinda Jia, Cong Xie, Hanlin Lu, **Daoce Wang**, Hao Feng, Chengming Zhang, Baixi Sun, Haibin Lin, Zhi Zhang, Xin Liu, and Dingwen Tao.
"SDP4Bit: Toward 4-bit Communication Quantization in Sharded Data Parallelism for LLM Training" The Thirty-Eighth Annual Conference on Neural Information Processing Systems, Vancouver, Canada, December 9–12, 2024.

SC '24 **Daoce Wang**, Pascal Grosset, Jesus Pulido, Tushar M. Athawale, Jiannan Tian, Kai Zhao, Zarija Lukic, Axel Huebl, Zhe Wang, James Ahrens, and Dingwen Tao.
"A High-Quality Workflow for Multi-Resolution Scientific Data Reduction and Visualization" The International Conference for High Performance Computing, Networking, Storage, and Analysis, Atlanta, GA, USA, November 17–22, 2024.

TPDS '24 **Daoce Wang**, Jesus Pulido, Pascal Grosset, Jiannan Tian, Sian Jin, Kai Zhao, James Ahrens, and Dingwen Tao.
"TAC+: Optimizing Error-Bounded Lossy Compression for 3D AMR Simulations" IEEE Transactions on Parallel and Distributed Systems

EUROSYS '24 Sian Jin, Sheng Di, Frédéric Vivien, **Daoce Wang**, Yves Robert, Dingwen Tao, and Franck Cappello.
"Concealing Compression-Accelerated I/O for HPC Applications through In Situ Task Scheduling" Proceedings of the Nineteenth European Conference on Computer Systems, Athens, Greece, April 22–25, 2024.

SC '23 **Daoce Wang**, Jesus Pulido, Pascal Grosset, Jiannan Tian, Sian Jin, Houjun Tang, Jean Sexton, Sheng Di, Zarija Luki, Kai Zhao, Bo Fang, Franck Cappello, James Ahrens, and Dingwen Tao.
"AMRIC: A Novel In Situ Lossy Compression Framework for Efficient I/O in Adaptive Mesh Refinement Applications" The International Conference for High Performance Computing, Networking, Storage, and Analysis, Denver, Colorado, USA, November 12–17, 2023.

HPDC '22 **Daoce Wang**, Jesus Pulido, Pascal Grosset, Jiannan Tian, James Ahrens, and Dingwen Tao.
"TAC: Optimizing Error-Bounded Lossy Compression for Three Dimensional Adaptive Mesh Refinement Simulations." ACM International Symposium on High-Performance Parallel and Distributed Computing, Minneapolis, Minnesota, USA, June 27–July 1, 2022.

CLUSTER '21 Bo Fang*, **Daoce Wang***, Sian Jin, Quincey Koziol, Zhao Zhang, Qiang Guan, Suren Byna, Sriram Krishnamoorthy, and Dingwen Tao.
"Characterizing Impacts of Storage Faults on HPC Applications: A Methodology and Insights." The 2021 IEEE International Conference on Cluster Computing, Portland, OR, United States, September 710, 2021. (* equal contribution)

CHINACOM '17 Baihua Ji, Xiao Liu, Tenghui Ke, Rongjie Kuang, Zibin Gao, and **Daoce Wang**.
"Research on the Monitoring Method of the Road Communication Network Quality Based on Vehicle Borne Internet of Things." Communications and Networking: 12th International Conference, ChinaCom 2017, Xian, China, October 10–12, 2017.

WORKSHOP & POSTER

Ph.D. Showcase **Daoce Wang**, Dingwen Tao
"Designing Efficient Data Reduction Approaches for Multi-resolution Simulations on HPC Systems"
SC '24 Doctoral Showcase

SC-W '24 Yanni Etchi, **Daoce Wang**, Pascal Grosset, Terece Turton, James Ahrens, and David Rogers.
"An Exploration of How Volume Rendering is Impacted by Lossy Data Reduction" The 10th International Workshop on Data Analysis and Reduction for Big Scientific Data (DRBSD-10) (in conjunction with SC 24 Conference), Atlanta, GA, United States, November 18, 2024. **Best Paper Runner-up**

SC-W '24 Qing Zheng, Brian Atkinson, **Daoce Wang**, Jason Lee, John Patchett, Dominic Manno, and Gary Grider.
"Accelerating Viz Pipelines Using Near-Data Computing: An Early Experience" (DRBSD-10) (in conjunction with SC 24 Conference), Atlanta, GA, United States, November 18, 2024.

SC-W '23 **Daoce Wang**, Jesus Pulido, Pascal Grosset, Jiannan Tian, James Ahrens, and Dingwen Tao.
"Analyzing Impact of Data Reduction Techniques on Visualization for AMR Applications Using AMReX Framework" The 9th International Workshop on Data Analysis and Reduction for Big Scientific Data (DRBSD-9) (in conjunction with SC 23 Conference), Denver, CO, United States, November 12, 2023.

SC '21 Poster **Daoce Wang**, Jesus Pulido, Pascal Grosset, Sian Jin, Jiannan Tian, James Ahrens, and Dingwen Tao.
"In-Situ Data Reduction for AMR-Based Cosmology Simulations" ACM Student Research Competition: Graduate Posters

EXPERIENCE

Research Intern, Los Alamos National Laboratory

2024 May–2024 August

- Developed streaming compression techniques for SZ2, with a focus on enabling random access functionality.
- Enhanced post-processing techniques to minimize compression error and reduce bias in error distribution.

Research Intern, Los Alamos National Laboratory

2023 May–2023 August

- Enhanced in-situ AMR compression to improve I/O and compression performance in AMR simulations.
- Investigated the impact of data compression on AMR data visualization.

Research Intern, Los Alamos National Laboratory

2022 June–2022 August

- Further Improved the compression ratio and throughput for AMR data compression.
- Integrated the SZ compressor into the AMR-based cosmology simulation code Nyx, utilizing HDF5 I/O.

Research Intern, Los Alamos National Laboratory

2021 June–2021 August

- Evaluated optimal lossy compression algorithms for an AMR cosmology simulation.

- Investigated the effective use of error-bounded lossy compression in AMR data reduction.

ACTIVITY

Review 24 Served as reviewer of TC '24 and subreviewer of HPDC '24, IPDPS '24, TPDS '24, TCC '24, as well as FGCS '24.

Talk 24 Presented SC24 paper at LANL Data Science at Scale Summer School.

Review 23 Served as subreviewer of HPDC '23, ICS '23, IPDPS '23, Euro-Par '23, ICPP '23, CCGRID '23, HiPC '23, TPDS '23, and TC '23.

Talk 23 Presented the "AMRIC" paper at SC '23.

Talk 23 Presented at SC '23 workshop (DRBSD-9).

Talk 23 Presented at 2023 HDF5 User Group Meeting (HUG23)

Review 22 Served as subreviewer of SC '22, TVCG '22, AAAI '22, ICS '22, CCGRID '22, FGCS '22, TC '22, TCC '22, TBD '22 and TPDS '22.

Talk 22 Presented the "TAC" paper at HPDC '22.

Talk 22 Poster presentation at HPDC '22.

Review 21 Served as subreviewer of CLUSTER '21, BigData '21, and TPDS '21.

Talk 21 Poster presentation at SC '21.

Talk 21 Presented the "FFIS" paper at CLUSTER '21.

AWARD & TRAVEL GRANT

2024 Ph.D. Student Travel Grant for SC 24 from Luddy School, Indiana University ($2,500.00)

2022 HPDC 2022 Student Travel Grant ($923.00)

2022 Graduate and Professional Student Association Travel Grant, Washington State University ($1,000.00)

2021 Cluster 2021 Student Attendance Award ($100.00)

REFERENCE

Dr. James Ahrens
Senior Scientist, Principal Investigator (PI)
Director of the Information Science and Technology Institute (ISTI)
Data and Visualization Project Lead for the U.S. Exascale Computing Project (ECP)
Los Alamos National Laboratory, Los Alamos, NM
Email: ahrens@lanl.gov

Dr. Pascal Grosset
Scientist, Internship Mentor
Data Science at Scale team
Los Alamos National Laboratory, Los Alamos, NM
Email: pascalgrosset@lanl.gov

Dr. Bo Fang
Staff Computer Scientist, Collaborator
High Performance Computing Group
Pacific Northwest National Lab, Richland, WA
Email: bo.fang@pnnl.gov

Dr. Dingwen Tao
Associate Professor, Thesis Advisor
Luddy School of Informatics, Computing, and Engineering
Indiana University, Bloomington, IN
Email: ditao@iu.edu

Dr. Jesus Pulido
Staff Scientist, Internship Mentor
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