

# Dingwen Tao

## Assistant Professor

School of EECS, Washington State University

Phone: (951) 236-2342 • Email: [dingwen.tao@wsu.edu](mailto:dingwen.tao@wsu.edu) • Web: <https://www.dingwentao.com/>

## Education

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<b>University of California, Riverside</b>	09/2013–06/2018
Ph.D. in Computer Science	Riverside, CA, USA
<b>University of Science and Technology of China</b>	09/2009–06/2013
B.S. in Mathematics	Hefei, Anhui, China

## Employment Experience

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<b>Washington State University</b> , School of EECS	08/2020–Present
Assistant Professor	Pullman, WA, USA
<b>The University of Alabama</b> , Department of Computer Science	08/2018–07/2020
Assistant Professor	Tuscaloosa, AL, USA
<b>Brookhaven National Laboratory</b> , Computational Science Initiative	01/2018–06/2018
Research Assistant	Upton, NY, USA
<b>Argonne National Laboratory</b> , Mathematics and Computer Science	06/2016–12/2017
Research Assistant	Lemont, IL, USA
<b>Pacific Northwest National Laboratory</b> , HPC Group	06/2015–09/2015
Graduate Research Intern	Richland, WA, USA

## Research Interests

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- High-performance computing (HPC), cloud computing, parallel & distributed system
- Scientific data management, analytics, & visualization
- Large-scale machine learning & deep learning
- Reconfigurable computing (such as FPGA)
- Fault tolerance, resilience, & reliability in HPC
- Scientific computing & simulation, numerical algorithm & software
- Big data software stack & ecosystem

## Grants and Contracts

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### Research Grants/Contracts (\$11.7 million is awarded in total, out of which my share is \$1.1M)

- **(Lead PI)** CDS&E: Collaborative Research: HyLoC: Objective-driven Adaptive Hybrid Lossy Compression Framework for Extreme-Scale Scientific Applications, \$527,563 (share: \$270,802), 08/01/2020 – 07/31/2023, NSF ([OAC-2042084](#), [OAC-2003709](#)).
- **(Single PI)** CRII: OAC: An Efficient Lossy Compression Framework for Reducing Memory Footprint for Extreme-

*Scale Deep Learning on GPU-Based HPC Systems*, \$174,593, 05/01/2020 – 04/30/2022, NSF ([OAC-2034169](#)).

- **(Single PI)** *Improving GPU Version of SZ for Scientific Applications at Extreme Scale*, \$63,791, 08/01/2020 – 07/31/2021, DOE Argonne National Laboratory ([No. 0F-60172](#)).
- **(Single PI)** *An Efficient Lossy Compression Framework for Reducing Memory Footprint for Extreme-Scale Deep Learning on GPU-Based HPC Systems*, 1,500 (initial) + 3,000 (supplement) GPU Hours at PSC GPU-AI system (estimated value: \$5,440.5), 5/14/2020 – 5/13/2021, XSEDE ([ASC200032](#)).
- **(Single PI)** *FPGA-Enhanced Scientific Data Management*, Xilinx Virtex UltraScale+ FPGA VCU118 Evaluation Kit (estimated value: \$7,000), Xilinx.
- **(Co-PI)** *CC\* Compute: Accelerating Advances in Science and Engineering at The University of Alabama Through HPC Infrastructure*, \$399,995 (share: \$100,000), 07/01/2020 – 06/30/2022, NSF ([OAC-2018846](#)).
- **(Co-PI)** *CISESS: Cooperative Institute for Satellite Earth System Studies*, \$5,552,781 (share: \$250,000), 06/01/2020 – 05/31/2021, NOAA.
- **(Single PI)** *Improving Lossy Compression for Scientific Applications at Extreme Scale*, \$21,588, 08/15/2019 – 12/31/2019, DOE Argonne National Laboratory ([No. 9F-60232](#)).
- **(Co-PI)** *Center for Remote Sensing of Snow and Soil Moisture*, \$5,000,000 (share: \$250,000), 06/01/2019 – 05/31/2020, NOAA.
- **(Single PI)** *FPGA-Enhanced Lossy Compression for Scientific Data*, 1x Xilinx Zynq-7000 SoC ZC706 Evaluation Kit and 2x ZedBoard Xilinx Zynq-7000 (estimated value: \$4,000), Xilinx.

### Travel Grants

- 12/2018 Faculty Travel Grant \$500, LBL SRP Program
- 06/2018 Student Travel Grant \$1,400, ACM HPDC'18
- 11/2017 Student Travel Grant \$1,500, ACM/IEEE SC'17
- 06/2017 Student Travel Grant \$250, IEEE IPDPS'17
- 06/2016 Student Travel Grant \$1,000, ACM HPDC'16

### Honors and Awards

- *Early Career Researchers Award for Excellence in High Performance Computing*. IEEE CS TCHPC, 2020.
- *CISE Research Initiation Initiative (CRII) Award*. National Science Foundation, 2020.
- *Best Paper Award*. IEEE Cluster Conference, 2018.
- *Dissertation Year Program (DYP) Award*. University of California, Riverside, 2017.
- *Dean's Distinguished Fellowship*. University of California, Riverside, 2013.
- *Outstanding Student Scholarship*. University of Science and Technology of China, 2012, 2010, and 2009.
- *1<sup>st</sup> Prize in National High School Mathematics League*. Anhui Province, China, 2008.
- *1<sup>st</sup> Prize in National Olympiad in Informatics*. Anhui Province, China, 2005.
- *Zhao Wei Fellowship*. Anhui Province, China, 2006.

### Publications

**Selected Referred Publications** (*with my students underlined, \*corresponding author, AR: acceptance rate*)

1. [PACT'20] Jiannan Tian, Sheng Di, Kai Zhao, Sian Jin, Megan Hickman, Robert Underwood, Xin Liang, Jon Calhoun, **Dingwen Tao\***, Franck Cappello. "cuSZ: An Efficient GPU Based Error-Bounded Lossy Compression Framework for Scientific Data." *The*

- 29th International Conference on Parallel Architectures and Compilation Techniques*, Atlanta, GA, USA, Oct 3–7, 2020. (AR: 25%, 35/137)
2. [ICPP'20] Zhenbo Hu, Xiangyu Zou, Wen Xia, Sian Jin, **Dingwen Tao**, Yang Liu, Weizhe Zhang, and Zheng Zhang. "Delta-DNN: Efficiently Compressing Deep Neural Networks via Exploiting Floats Similarity." *The 49th International Conference on Parallel Processing*, Edmonton, AB, CANADA, August 17 - 20 2020. (AR: 28%, 78/269)
  3. [DAC'20] Peiyang Dong, Siyue Wang, Wei Niu, Chengming Zhang, Sheng Lin, Zhengang Li, Yifan Gong, Bin Ren, Xue Lin, **Dingwen Tao\***. "RTMobile: Beyond Real-Time Mobile Acceleration of RNNs for Speech Recognition." *The 57th Annual Design Automation Conference*, San Francisco, CA, USA, July 19–23, 2020.
  4. [HPDC'20] Kai Zhao, Sheng Di, Xin Liang, Sihuan Li, **Dingwen Tao**, Zizhong Chen, Franck Cappello. "Significantly Improving Lossy Compression for HPC Datasets with Second-Order Prediction and Parameter Optimization." *The 29th ACM International Symposium on High-Performance Parallel and Distributed Computing*, Sweden, June 23–26, 2020. (AR: 22%, 16/71)
  5. [IPDPS'20] Sian Jin, Pascal Grosset, Christopher M. Biber, Jesus Pulido, Jiannan Tian, **Dingwen Tao\***, James Ahrens. "Understanding GPU-Based Lossy Compression for Extreme-Scale Cosmological Simulations." *IEEE International Parallel and Distributed Symposium*, New Orleans, LA, USA, May 18–22, 2020. (AR: 24%, 110/446)
  6. [PPoPP'20] Jiannan Tian, Sheng Di, Chengming Zhang, Xin Liang, Sian Jin, Dazhao Cheng, **Dingwen Tao\***, Franck Cappello. "waveSZ: A Hardware-Algorithm Co-Design of Efficient Lossy Compression for Scientific Data." *The 25th ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming*, San Diego, USA, February 22–26, 2020. (AR: 23%, 28/121)
  7. [HPDC'19] Sian Jin, Sheng Di, Xin Liang, Jiannan Tian, **Dingwen Tao\***, Franck Cappello. "DeepSZ: A Novel Framework to Compress Deep Neural Networks by Using Error-Bounded Lossy Compression." *The 28th ACM International Symposium on High-Performance Parallel and Distributed Computing*, Phoenix, AZ, USA, June 24–28, 2019. (AR: 20%, 22/106)
  8. [TPDS] **Dingwen Tao**, Sheng Di, Xin Liang, Zizhong Chen, Franck Cappello. "Optimizing Lossy Compression Rate-Distortion from Automatic Online Selection Between SZ and ZFP." *IEEE Transactions on Parallel and Distributed Systems* 30(8): 1857-1871 (2019).
  9. [IJHPCA] **Dingwen Tao**, Sheng Di, Hanqi Guo, Zizhong Chen, Franck Cappello. "Z-checker: A Framework for Assessing Lossy Compression of Scientific Data." *The International Journal of High-Performance Computing Applications* 33(2) (2019).
  10. [HPDC'18] **Dingwen Tao**, Sheng Di, Xin Liang, Zizhong Chen, Franck Cappello. "Improving Performance of Iterative Methods by Lossy Checkpointing." *The 27th ACM International Symposium on High-Performance Parallel and Distributed Computing*, Tempe, AZ, USA, June 11– 15, 2018. (AR: 19%, 22/112)
  11. [Cluster'18] Xin Liang, Sheng Di, **Dingwen Tao**, Zizhong Chen, Franck Cappello. "An Efficient Transformation Scheme for Lossy Data Compression with Point-wise Relative Error Bound." *IEEE International Conference on Cluster Computing*, Belfast, UK, September 10–13, 2018. (AR: 2.6%, 4/154) **Best Area Paper Award**
  12. [Cluster'18] Ali Murat Gok, Sheng Di, Yury Alexeev, **Dingwen Tao**, Vladimir Mironov, Franck Cappello. "PaSTRI: Error-Bounded Lossy Compression for Two-Electron Integrals in Quantum Chemistry." *IEEE International Conference on Cluster Computing*, Belfast, UK, September 10–13, 2018. (AR: 0.7%, 1/154) **Best Overall Paper Award**
  13. [BigData'17] **Dingwen Tao**, Sheng Di, Zizhong Chen, Franck Cappello. "In-Depth Exploration of Single-Snapshot Lossy Compression Techniques for N-Body Simulations." *IEEE International Conference on Big Data*, Boston, MA, USA, December 11–14, 2017. (AR: 19%, 87/437)
  14. [IPDPS'17] **Dingwen Tao**, Sheng Di, Zizhong Chen, Franck Cappello. "Significantly Improving Lossy Compression for Scientific Data Sets Based on Multidimensional Prediction and Error-Controlled Quantization." *IEEE International Parallel and Distributed Processing Symposium*, Orlando, FL, USA, May 29–June 2, 2017. (AR: 22%, 116/508)
  15. [HPDC'16] **Dingwen Tao**, Shuaiwen Leon Song, Sriram Krishnamoorthy, Panrui Wu, Xin Liang, Eddy Z. Zhang, Darren Kerbyson,

Zizhong Chen. “New-Sum: A Novel Online ABFT Scheme for General Iterative Methods.” *The 25th ACM International Symposium on High-Performance Parallel & Distributed Computing*, Kyoto, JAPAN, May 31–June 4, 2016. (AR: 15%, 20/129)

### Full List of Referred Conference & Workshop Publications

1. [PACT’20] [Jiannan Tian](#), Sheng Di, Kai Zhao, [Sian Jin](#), Megan Hickman, Robert Underwood, Xin Liang, Jon Calhoun, **Dingwen Tao\***, Franck Cappello. “cuSZ: An Efficient GPU Based Error-Bounded Lossy Compression Framework for Scientific Data.” *The 29th International Conference on Parallel Architectures and Compilation Techniques*, Atlanta, GA, USA, Oct 3–7, 2020.
2. [DAC’20] Peiyan Dong, Siyue Wang, Wei Niu, [Chengming Zhang](#), Sheng Lin, Zhengang Li, Yifan Gong, Bin Ren, Xue Lin, **Dingwen Tao\***. “RTMobile: Beyond Real-Time Mobile Acceleration of RNNs for Speech Recognition.” *The 57th Annual Design Automation Conference*, San Francisco, CA, USA, July 19–23, 2020.
3. [HPDC’20] Kai Zhao, Sheng Di, Xin Liang, Sihuan Li, **Dingwen Tao**, Zizhong Chen, Franck Cappello. “Significantly Improving Lossy Compression for HPC Datasets with Second-Order Prediction and Parameter Optimization.” *The 29th ACM International Symposium on High-Performance Parallel and Distributed Computing*, Stockholm, Sweden, June 23–26, 2020.
4. [IPDPS’20] [Sian Jin](#), Pascal Grosset, Christopher M. Biwer, Jesus Pulido, [Jiannan Tian](#), **Dingwen Tao\***, James Ahrens. “Understanding GPU-Based Lossy Compression for Extreme-Scale Cosmological Simulations.” *IEEE International Parallel and Distributed Symposium*, New Orleans, LA, May 18–22, 2020.
5. [PPoPP’20] [Jiannan Tian](#), Sheng Di, [Chengming Zhang](#), Xin Liang, [Sian Jin](#), Dazhao Cheng, **Dingwen Tao\***, Franck Cappello. “waveSZ: A Hardware-Algorithm Co-Design of Efficient Lossy Compression for Scientific Data.” *The 25th ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming*, San Diego, CA, USA, Feb 22–26, 2020.
6. [HPDC’19] [Sian Jin](#), Sheng Di, Xin Liang, [Jiannan Tian](#), **Dingwen Tao\***, Franck Cappello. “DeepSZ: A Novel Framework to Compress Deep Neural Networks by Using Error-Bounded Lossy Compression.” *The 28th ACM International Symposium on High-Performance Parallel and Distributed Computing*, Phoenix, AZ, USA, June 24–28, 2019.
7. [SC’19] Xin Liang, Sheng Di, Sihuan Li, **Dingwen Tao**, Bogdan Nicolae, Zizhong Chen, Franck Cappello. “Significantly Improving Lossy Compression Quality Based on An Optimized Hybrid Prediction Model.” *The International Conference for High Performance Computing, Networking, Storage and Analysis*, Denver, CO, USA, Nov 17–22, 2019.
8. [BigData’19] Yuqi Fu, Shaolun Zhang, Jose Terrero, Ying Mao, Guangya Liu, Sheng Li, **Dingwen Tao**. “Progress-based Container Scheduling for Short-lived Applications in a Kubernetes Cluster.” *IEEE International Conference on Big Data*, Los Angeles, CA, USA, December 9–12, 2019.
9. [BigData’19] Donglin Yang, Wei Rang, Dazhao Cheng, Yu Wang, [Jiannan Tian](#), **Dingwen Tao**. “Elastic Executor Provisioning for Iterative Workloads on Apache Spark.” *IEEE International Conference on Big Data*, Los Angeles, CA, USA, December 9–12, 2019.
10. [Cluster’19] Xin Liang, Sheng Di, **Dingwen Tao**, Sihuan Li, Bogdan Nicolae, Zizhong Chen, Franck Cappello. “Improving Performance of Data Dumping with Lossy Compression for Scientific Simulation.” *IEEE International Conference on Cluster Computing*, Albuquerque, NM, USA, September 23–26, 2019.
11. [HPCC’19] Xiangyu Zou, Tao Lu, Sheng Di, **Dingwen Tao**, Wen Xia, Xuan Wang, Weizhe Zhang, Qing Liao. “Accelerating Lossy Compression on HPC datasets via Partitioning Computation for Parallel Processing.” *IEEE International Conference on High Performance Computing and Communications*, Zhangjiajie, China, Aug 10–12, 2019.
12. [ICS’19] Jieyang Chen, Nan Xiong, Xin Liang, **Dingwen Tao**, Sihuan Li, Kaiming Ouyang, Kai Zhao, Nathan DeBardeleben, Qiang Guan, Zizhong Chen. “TSM2: Optimizing Tall-and-Skinny Matrix-Matrix Multiplication on GPUs.” *The 33rd ACM International Conference on Supercomputing*, Phoenix, AZ, USA, June 26–28, 2019.

13. **[MSST'19]** Xiangyu Zou, Tao Lu, Wen Xia, Xuan Wang, Weizhe Zhang, Sheng Di, **Dingwen Tao**, Franck Cappello. "Accelerating Relative-error Bounded Lossy Compression for HPC datasets with Precomputation-Based Mechanisms." *IEEE Symposium on Mass Storage Systems and Technologies*, Santa Clara, CA, USA, May 20–24, 2019.
14. **[NYSDS'18]** Line Pouchard, Kevin Huck, Gyorgy Matyasfalvi, **Dingwen Tao**, Li Tang, Huub Van Dam, Shinjae Yoo. "Prescriptive Provenance for Streaming Analysis of Workflows at Scale." *2018 New York Scientific Data Summit*, New York, NY, USA, August 6–8, 2018.
15. **[BigData'18]** Xin Liang, Sheng Di, **Dingwen Tao**, Sihuan Li, Shaomeng Li, Hanqi Guo, Zizhong Chen, Franck Cappello. "Error-Controlled Lossy Compression Optimized for High Compression Ratios of Scientific Datasets." *IEEE International Conference on Big Data*, Seattle, WA, USA, December 10–13.
16. **[Cluster'18]** **Dingwen Tao**, Sheng Di, Xin Liang, Zizhong Chen, Franck Cappello. "Design of Fixed-PSNR Lossy Compression for HPC Scientific Data." *IEEE International Conference on Cluster Computing*, Belfast, UK, September 10–13, 2018.
17. **[Cluster'18]** Xin Liang, Sheng Di, **Dingwen Tao**, Zizhong Chen, Franck Cappello. "An Efficient Transformation Scheme for Lossy Data Compression with Point-wise Relative Error Bound." *IEEE International Conference on Cluster Computing*, Belfast, UK, September 10–13, 2018. **(Best Track Paper Award)**
18. **[Cluster'18]** Ali Murat Gok, Sheng Di, Yury Alexeev, **Dingwen Tao**, Vladimir Mironov, Franck Cappello. "PaSTRI: Error-Bounded Lossy Compression for Two-Electron Integrals in Quantum Chemistry." *IEEE International Conference on Cluster Computing*, Belfast, UK, September 10–13, 2018. **(Best Overall Paper Award)**
19. **[SC'18]** Jieyang Chen, Hongbo Li, Sihuan Li, Xin Liang, Panruo Wu, **Dingwen Tao**, Kaiming Ouyang, Yuanlai Liu, Kai Zhao, Qiang Guan, Zizhong Chen. "FT-MAGMA: Fault Tolerance Dense Matrix Decomposition on Heterogeneous Systems with GPUs." *The International Conference for High Performance Computing, Networking, Storage and Analysis*, Dallas, TX, USA, Nov 11–16, 2017.
20. **[DRBSD-4]** Xin Liang, Sheng Di, **Dingwen Tao**, Sihuan Li, Zizhong Chen, Franck Cappello. "Improving In-situ Lossy Compression with Spatio-Temporal Decimation based on SZ Model." *The 4th International Workshop on Data Reduction for Big Scientific Data in Conjunction with SC'18*, Dallas, TX, USA, Nov 12–15, 2018.
21. **[HPDC'18]** **Dingwen Tao**, Sheng Di, Xin Liang, Zizhong Chen, Franck Cappello. "Improving Performance of Iterative Methods by Lossy Checkpointing." *The 27th ACM International Symposium on High-Performance Parallel and Distributed Computing*, Tempe, AZ, USA, June 11–15, 2018.
22. **[BigData'17]** **Dingwen Tao**, Sheng Di, Zizhong Chen, Franck Cappello. "In-Depth Exploration of Single-Snapshot Lossy Compression Techniques for N-Body Simulations." *IEEE International Conference on Big Data*, Boston, MA, USA, December 11–14, 2017.
23. **[SC'17]** Xin Liang, Jieyang Chen, **Dingwen Tao**, Sihuan Li, Panruo Wu, Hongbo Li, Kaiming Ouyang, Yuanlai Liu, Fengguang Song, Zizhong Chen. "Correcting Soft Errors Online in Fast Fourier Transform." *The International Conference for High Performance Computing, Networking, Storage and Analysis*, Denver, CO, USA, Nov 12–17, 2017.
24. **[DRBSD-2]** Sheng Di, **Dingwen Tao**, Franck Cappello. "An Efficient Approach to Lossy Compression with Pointwise Relative Error Bound." *The 2nd International Workshop on Data Reduction for Big Scientific Data in Conjunction with SC'17*, Denver, CO, USA, Nov 12–17, 2017.
25. **[EuroPar'17]** Ian Foster, Mark Ainsworth, Bryce Allen, Julie Bessac, Franck Cappello, Jong Youl Choi, Emil Constantinescu, Philip E Davis, Sheng Di, Wendy Di, Hanqi Guo, Scott Klasky, Kerstin Kleese Van Dam, Tahsin Kurc, Qing Liu, Abid Malik, Kshitij Mehta, Klaus Mueller, Todd Munson, George Ostouchov, Manish Parashar, Tom Peterka, Line Pouchard, **Dingwen**

- Tao**, Ozan Tugluk, Stefan Wild, Matthew Wolf, Justin M Wozniak, Wei Xu, Shinjae Yoo. “Computing Just What You Need: Online Data Analysis and Reduction at Extreme Scales.” *International European Conference on Parallel and Distributed Computing*, Santiago de Compostela, Spain, Aug 28–Sept 1, 2017.
26. **[IPDPS’17] Dingwen Tao**, Sheng Di, Zizhong Chen, Franck Cappello. “Significantly Improving Lossy Compression for Scientific Data Sets Based on Multidimensional Prediction and Error-Controlled Quantization.” *IEEE International Parallel & Distributed Processing Symposium*, Orlando, FL, USA, May 29–June 2, 2017.
  27. **[DRBSD-1] Dingwen Tao**, Sheng Di, Zizhong Chen, Franck Cappello. “Exploration of Pattern-Matching Techniques for Lossy Compression on Cosmology Simulation Data Sets.” *The 1st International Workshop on Data Reduction for Big Scientific Data in Conjunction with ISC’17*, Frankfurt, Germany, June 22, 2017.
  28. **[PPoPP’17]** Panruo Wu, Nathan Debardeleben, Qiang Guan, Sean Blanchard, Jieyang Chen, **Dingwen Tao**, Xin Liang, Kaiming Ouyang, Sihuan Li, Zizhong Chen. “Silent Data Corruption Resilient Two-sided Matrix Factorizations.” *The 22nd ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming*, Austin, TX, USA, February 4–8, 2017.
  29. **[SC’16]** Jieyang Chen, Li Tan, Panruo Wu, **Dingwen Tao**, Hongbo Li, Xin Liang, Sihuan Li, Rong Ge, Laxmi Bhuyan, Zizhong Chen. “GreenLA: Green Linear Algebra Software for GPU-Accelerated Heterogeneous Computing.” *The International Conference for High Performance Computing, Networking, Storage and Analysis*, Salt Lake City, UT, USA.
  30. **[HPDC’16] Dingwen Tao**, Shuaiwen Leon Song, Sriram Krishnamoorthy, Panruo Wu, Xin Liang, Eddy Z. Zhang, Darren Kerbyson, Zizhong Chen. “New-Sum: A Novel Online ABFT Scheme for General Iterative Methods.” *The 25th ACM International Symposium on High-Performance Parallel and Distributed Computing*, Kyoto, JAPAN, May 31– June 4, 2016.
  31. **[HPDC’16]** Panruo Wu, Qiang Guan, Nathan DeBardeleben, Sean Blanchard, **Dingwen Tao**, Xin Liang, Jieyang Chen, Zizhong Chen. “Towards Practical Algorithm Based Fault Tolerance in Dense Linear Algebra.” *The 25th ACM International Symposium on High-Performance Parallel and Distributed Computing*, Kyoto, JAPAN, May 31–June 4, 2016.
  32. **[ICPADS’14]** Longxiang Chen, **Dingwen Tao**, Panruo, Zizhong Chen. “Extending Checksum-Based ABFT to Tolerate Soft Errors Online in Iterative Methods.” *IEEE International Conference on Parallel and Distributed Systems, Hsinchu, Taiwan, December 16–19, 2014*.

### Full List of Referred Journal Publications

1. **[TPDS]** Xiangyu Zou, Tao Lu, Wen Xia, Xuan Wang, Weizhe Zhang, Haijun Zhang, Sheng Di, **Dingwen Tao**, Franck Cappello. “Performance Optimization for Relative-Error-Bounded Lossy Compression on Scientific Data.” *IEEE Transactions on Parallel and Distributed Systems* 31(7): 1665-1680 (2020).
2. **[IJHPCA]** Franck Cappello, Sheng Di, Sihuan Li, Xin Liang, Ali Murat Gok, **Dingwen Tao**, Chun Hong Yoon, Xin-Chuan Wu, Yuri Alexeev, Frederic T. Chong. “Use Cases of Lossy Compression for Floating-Point Data in Scientific Datasets.” *The International Journal of High Performance Computing Applications* 33(6) (2019).
3. **[TPDS] Dingwen Tao**, Sheng Di, Xin Liang, Zizhong Chen, Franck Cappello. “Optimizing Lossy Compression Rate-Distortion from Automatic Online Selection Between SZ and ZFP.” *IEEE Transactions on Parallel and Distributed Systems* 30(8): 1857-1871 (2019).
4. **[IJHPCA] Dingwen Tao**, Sheng Di, Hanqi Guo, Zizhong Chen, Franck Cappello. “Z-checker: A Framework for Assessing Lossy Compression of Scientific Data.” *The International Journal of High Performance Computing Applications* 33(2) (2019).
5. **[TPDS]** Sheng Di, **Dingwen Tao**, Xin Liang, Franck Cappello. “Efficient Lossy Compression for Scientific Data based on Pointwise Relative Error Bound.” *IEEE Transactions on Parallel and Distributed Systems* 30(2): 331-345 (2019).

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## Professional Service

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### Journal Reviewer

- IEEE Transactions on Smart Grid (Impact Factor: 10.490)
- IEEE Transactions on Cloud Computing (Impact Factor: 5.967)
- IEEE Transactions on Big Data (Impact Factor: 5.670)
- IEEE Transactions on Emerging Topics in Computing (Impact Factor: 4.989)
- IEEE Access (Impact Factor: 4.098)
- IEEE Transactions on Parallel and Distributed Systems (Impact Factor: 3.402)
- IEEE Transactions on Computers (Impact Factor: 3.131)
- SIAM Journal on Scientific Computing (Impact Factor: 2.310)
- Scientific Programming (Impact Factor: 1.289)
- Parallel Computing (Impact Factor: 1.281)
- Journal of Systems Architecture (Impact Factor: 1.159)
- Integration the VLSI Journal (Impact Factor: 1.150)

### Conference Program Committee

- *Program Co-Chair* of 2021 IEEE International Conference on Scalable Computing & Communications (ScalCom)
- 2020, 2021 IEEE International Conference on Cluster Computing (Cluster)
- 2018, 2019, 2020 IFIP International Conference on Network and Parallel Computing (NPC)
- 2020 IEEE/ACM International Conference for High Performance Computing, Networking, Storage, & Analysis (SC)
- 2020 International Conference on Parallel Processing (ICPP)
- 2019, 2020 International Conference on Services Computing (SCC)
- 2018, 2019 IEEE International Congress on Big Data (BigData Congress)
- 2018, 2019 IEEE International Conference on High Performance Computing, Data, and Analytics (HiPC)
- 2018 IEEE International Conference on e-Science (eScience)

### Conference External Reviewer

- 2015, 2016, 2017, 2018 ACM/IEEE International Conference for High Performance Computing, Networking, Storage, and Analysis (SC)
- 2016, 2017, 2018 IEEE International Parallel and Distributed Processing Symposium (IPDPS)
- 2017 ACM International Conference on Supercomputing (ICS)
- 2017 ACM International Symposium on High-Performance Parallel and Distributed Computing (HPDC)
- 2016 IEEE International Conference on Parallel and Distributed Systems (ICPADS)
- 2016 ACM International Conference on Supercomputing (ICS)
- 2015 International Conference on Parallel Architectures and Compilation Techniques (PACT)
- 2014 IEEE/ACM International Symposium on Cluster, Cloud, and Grid Computing (CCGrid)

### Workshop Program Committee

- *Program Co-chair* of the 1st International Workshop on Big Data Reduction (IWBDR) held with IEEE BigData 2020
- *Program Co-chair* of the 1st & 2nd International Workshop on Big Data Analytics of Cyber-Physical Systems (CPSBigData) held with IEEE IGSC 2019, 2020

- The 1st, 2nd, 3rd High-Performance Machine Learning Workshop (HPML) held with IEEE SBAC-PAD 2018, IEEE/ACM CCGrid 2019, 2020
- The 4th Fault Tolerant Systems Workshop (FTS) held with IEEE Cluster 2018
- The 1st International Workshop on Large-Scale Deep Learning on Modern Heterogeneous Supercomputers (DLMHS) held with ACM ICS 2018

### **Workshop External Reviewer**

- The 10th, 11th, 12th Workshop on Resiliency in High Performance Computing (Resilience) in Clusters, Clouds, and Grids held with Euro-Par 2017, 2018, 2019

### **Curriculum Development**

- Development of *UA CS 481/581: High-Performance Computing*, which provides students with knowledge and fundamental concepts of HPC as well as hands-on experience of the core technology in the field.

### **Membership**

- Member, Association for Computing Machinery (2016–Present)
- Member, Institute of Electrical and Electronics Engineers (2017–Present)

## **Teaching Experience**

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### **Undergraduate Course**

- CS/EE 233: *Advanced Data Structures in Java*, Spring 2021 (WSU)
- CS/EE 455: *Introduction to Computer Networks*, Fall 2020 (WSU)
- CS 211: *High Performance Computing*, Fall 2014, Fall 2015 & Fall 2016 (UCR)
- CS 012: *Intro to Computer Science for Science, Mathematics, and Engineering II*, Winter 2015 (UCR)
- CS 008: *Introduction to Computing*, Fall 2014 (UCR)
- CS 006: *Effective Use of the World Wide Web*, Fall 2014 (UCR)

### **Graduate Course**

- CS 481/581: *High Performance Computing*, Spring 2019, Spring 2020 (UA)
- CS 470/570: *Computer Algorithms*, Fall 2019 (UA)

## **Student Mentorship**

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### **Doctoral Dissertation Chair**

Sian Jin (Fall 18–), Jiannan Tian (Spring 19–), Chengming Zhang (Fall 19–), Daoce Wang (Fall 20–)

### **Doctoral Dissertation Committee Member**

Peyman Abbaszadeh (Spring 20), Nasir U. Eisty (Spring 20), Tasnuva Mahjabin (Spring 20)

### **Undergraduate Research Mentor**

Cody Rivera (Spring 19–), Philip Speegle (Fall 19–Spring 20), Jack O'Donohue, Aashman Gupta (Summer 19)



## Invited Talks

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- “*Scientific Data Reduction Challenges in the Era of Exascale Computing*”, Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA, December 2019.
- “*Keeping-up with Scientific Data Explosion in the Era of Exascale Computing*”, Boston University & Northeastern University, Boston, Massachusetts, USA, November 2019.
- “*Keeping-up with Scientific Data Explosion in the Era of Exascale Computing*”, University of California, Merced, California, USA, October 2019.
- “*High-Performance Computing at Extreme Scale: Keeping-up with Scientific Data Explosion*”, Los Alamos National Laboratory, Los Alamos, New Mexico, USA, July 2019.
- “*High-Performance Computing at Extreme Scale: Keeping-up with Flood of Scientific Data*”, College of Information Science and Engineering, Beijing, China, June 2019.
- “*High-Performance Computing at Extreme Scale: Data Reduction, Resilience, Scalability*”, Institute of Computing Technology (ICT), Chinese Academy of Sciences (CAS), Beijing, China, October 2018.
- “*High-Performance Computing at Extreme Scale: Data Reduction, Resilience, Scalability*”, College of Software Engineering, Tsinghua University, Beijing, China, October 2018.
- “*GreenLA: Energy Efficient Linear Algebra Software for GPU-Accelerated Heterogeneous Computing*”, Energy-Efficient Computing Workshop, HPC China 2018, Qingdao, China, September 2018.

## Selected Software

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- [SZ](#): Fast, Effective, Parallel Error-bounded Exascale Scientific Data Lossy Compressor
- [cuSZ](#): A GPU Accelerated Error-Bounded Lossy Compressor for Scientific Data
- [DeepSZ](#): Lossy Compression Framework for Deep Neural Networks
- [TSM2X](#): High-Performance Tall-and-Skinny Matrix-Matrix Multiplication on GPUs
- [Foresight](#): A Compression Benchmark Suite for Visualization and Analysis of Simulation Data
- [Z-checker](#): Exascale Scientific Data Analysis and Lossy Compression Assessment Library

## Professional Reference

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Dr. Zizhong (Jeffrey) Chen

Professor, University of California, Riverside

Email: [chen@cs.ucr.edu](mailto:chen@cs.ucr.edu)

Phone: +1 (951) 827-2403

Dr. Franck Cappello (IEEE Fellow)

Senior Computer Scientist, Argonne National Laboratory

Email: [cappello@mcs.anl.gov](mailto:cappello@mcs.anl.gov)

Phone: +1 (630) 252-0715

Dr. Sheng Di

Computer Scientist, Argonne National Laboratory

Email: [sdi1@anl.gov](mailto:sdi1@anl.gov)

Phone: +1 (630) 252-1520

Dr. Laxmi N. Bhuyan (ACM/IEEE/AAAS Fellow)

Distinguished Professor, University of California, Riverside

Email: [bhuyan@cs.ucr.edu](mailto:bhuyan@cs.ucr.edu)

Phone: +1 (951) 827-2281

Dr. Shuaiwen Leon Song

Associate Professor, The University of Sydney

Email: [shuaiwen.song@sydney.edu.au](mailto:shuaiwen.song@sydney.edu.au)

Phone: +61 2 8627 961