# Jieyang Chen

Computer Science and Mathematics Division
Oak Ridge National Laboratory

## EDUCATION

**Ph.D.**, Major: Computer Science *09/2015 - 03/2019*
Advisor: Dr. Zizhong Chen *University of California, Riverside*
**Master of Science**, Major: Computer Science *09/2012 - 12/2014*
Advisor: Dr. Zizhong Chen *University of California, Riverside*
**Bachelor of Engineering**, Major: Computer Science and Technology *09/2008 - 07/2012*
Advisor: Dr. Dan Wang *Beijing University of Technology*

## RESEARCH INTERESTS

- High Performance Computing
- Scientific Data Management
- Scientific Visualization/Data Analytics
- GPU Computing

## WORK EXPERIENCE

**Computer Scientist** 12/2020 - present
*Oak Ridge National Laboratory*

· *Scientific Visualization with Lossy Compression (DOE/ECP-ALPINE)*: Studied the performance-quality trade-offs in scientific visualization workflows with lossy compression.
· *GPU-accelerated Lossy Compression (DOE/ECP-CODAR)*: Designed and developed multigrid-based scientific data refactoring/reduction software for modern GPU accelerators.
· *Multi-/Many-core accelerated visualization toolkit (DOE/ECP-VTKM)*: Designed and developed scientific visualization tools for the next generations of multi-/many-core accelerated computing systems.

**Postdoctoral Research Associate** 05/2019 - 11/2020
*Oak Ridge National Laboratory*

· *Scientific Visualization with Lossy Compression (DOE/ECP-ALPINE)*: Studied the performance-quality trade-offs in scientific visualization workflows with lossy compression.
· *GPU-accelerated Lossy Compression (DOE/ECP-CODAR)*: Designed and developed multigrid-based scientific data refactoring/reduction software for modern GPU accelerators.

**Research and Development Internship** 07/2018 - 09/2018
*Pacific Northwest National Laboratory*

· *Evaluating Multi-GPU Systems (DOE/ECP-CENATE):* Developed benchmark suits for evaluating modern GPU interconnect: PCIe, NVLink, NVSwitch, and GPUDirect RDMA.
· *Sparse BLAS on Multi-GPU Systems (PNNL-HPDA):* Designed optimized data structure and scheduling strategies to speed up core sparse linear algebra kernels on multi-GPU systems.

**Research and Development Internship** 01/2017 - 06/2017
*Los Alamos National Laboratory*

· *Containerized In Situ Visualization Workflow System (DOE/ECP-BEE):* Designed and developed a workflow management system for launching containerized execution environment for scientific in situ visualization workflows on HPC and cloud infrastructure.

**Research Assistant** 11/2014 - 03/2019

*University of California, Riverside*

- *GPU Fault Tolerance:* Designed and developed fault tolerance matrix decomposition algorithms (Cholesky, LU, and QR) that can detect and correct silent data corruptions (SDCs) on heterogeneous systems with GPUs.
- *GPU Energy Efficiency Optimization:* Designed and developed energy efficient matrix decomposition algorithms based on Dynamic Voltage and Frequency Scaling (DVFS) and slack prediction on heterogeneous systems with GPUs.
- *GPU Performance Optimization:* Designed and developed the optimized matrix-matrix multiplication specialized for tall-and-skinny inputs on modern GPUs.

**Teaching Assistant** 01/2016-12/2018

*University of California, Riverside*

- CS 211: High Performance Computing
- CS 180: Introduction to Software Engineering
- CS 8: Introduction to Computing
- CS 177: Modeling and Simulation

## PUBLICATIONS (C: CONFERENCE PAPERS; J: JOURNAL PAPERS; B: BOOK CHAPTERS)

- **[C31]** Qian Gong, Ben Whitney, Chengzhu Zhang, Xin Liang, Anand Rangarajan, **Jieyang Chen**, Lipeng Wan, Paul Ullrich, Qing Liu, Robert Jacob, Sanjay Ranka, Scott Klasky. "Region-adaptive, Error-controlled Scientific Data Compression using Multilevel Decomposition." *the 34th International Conference on Scientific and Statistical Database Management*, Copenhagen, Denmark, ACM, Jul. 2022
- **[J9]** Ana Gainaru, Lipeng Wan, Ruonan Wang, Eric Suchyta, **Jieyang Chen**, Norbert Podhorszki, James Kress, David Pugmire, Scott Klasky. "Understanding the Impact of Data Staging for Coupled Scientific Workflows." *IEEE Transactions on Parallel and Distributed Systems*, Published in 2022
- **[J8]** Huizhang Luo, Junqi Wang, Qing Liu, **Jieyang Chen**, Scott Klasky, Norbert Podhorszki. "zMesh: Theories and Methods to Exploring Application Characteristics to Improve Lossy Compression Ratio for Adaptive Mesh Refinement." *IEEE Transactions on Parallel and Distributed Systems*, Published in 2022
- **[B1]** David Pugmire, Norbert Podhorszki, Scott Klasky, Matthew Wolf, James Kress, Mark Kim, Nicholas Thompson, Jeremy Logan, Ruonan Wang, Kshitij Mehta, Eric Suchyta, William Godoy, Jong Choi, George Ostrouchov, Lipeng Wan, **Jieyang Chen**, Berk Geveci Chuck Atkins, Caitlin Ross, Greg Eisenhauer, Junmin Gu, John Wu, Axel Huebl, Seiji Tsutsumi. "The Adaptable IO System (ADIOS)." *In Situ Visualization for Computational Science*, Published in 2022
- **[C30]** Qian Gong, Xin Liang, Ben Whitney, Jong Youl Choi, **Jieyang Chen**, Lipeng Wan, Stéphane Ethier, Seung-Hoe Ku, R Michael Churchill, C-S Chang, Mark Ainsworth, Ozan Tugluk, Todd Munson, David Pugmire, Richard Archibald, Scott Klasky. "Maintaining Trust in Reduction: Preserving the Accuracy of Quantities of Interest for Lossy Compression." *2021 Smoky Mountains Computational Sciences and Engineering Conference*, Virtual, Oct. 2021
- **[C29]** Xinying Wang, Lipeng Wan, **Jieyang Chen**, Qian Gong, Ben Whitney, Jinzhen Wang, Ana Gainaru, Qing Liu, Norbert Podhorszki, Dongfang Zhao, Feng Yan, Scott Klasky. "Unbalanced Parallel I/O: An Often-Neglected Side Effect of Lossy Scientific Data Compression." *2021*

*7th International Workshop on Data Analysis and Reduction for Big Scientific Data*, St. Louis, Missouri, ACM, Nov. 2021

- **[C28]** Xin Liang, Qian Gong, **Jieyang Chen**, Ben Whitney, Lipeng Wan, Qing Liu, David Pugmire, Rick Archibald, Norbert Podhorszki, Scott Klasky. "Error-controlled, progressive, and adaptable retrieval of scientific data with multilevel decomposition." *Proceedings of the 33th ACM/IEEE International Conference for High Performance Computing, Networking, Storage and Analysis*, St. Louis, Missouri, ACM, Nov. 2021

- **[J7]** Lipeng Wan, Axel Huebl, Junmin Gu, Franz Poeschel, Ana Gainaru, Ruonan Wang, **Jieyang Chen**, Xin Liang, Dmitry Ganyushin, Todd Munson, Ian Foster, Jean-Luc Vay, Norbert Podhorszki, Kesheng Wu, Scott Klasky. "Improving I/O Performance for Exascale Applications through Online Data Layout Reorganization." *IEEE Transactions on Parallel and Distributed Systems*, Published in 2021

- **[C27]** Jake Tronge, **Jieyang Chen**, Patricia Grubel, Tim Randles, Rusty Davis, Quincy Wofford, Steven Anaya, and Qiang Guan. "BeeSwarm: Enabling Parallel Scaling Performance Measurement in Continuous Integration for HPC Applications." *36th IEEE/ACM International Conference on Automated Software Engineering*, Melbourne, Australia, Nov. 15-19, 2021

- **[C26]** Chenhao Xie, **Jieyang Chen**, Jesun S. Firoz, Jiajia Li, Shuaiwen Leon Song, Kevin Barker, Mark Raugas, and Ang Li. "Fast and Scalable Sparse Triangular Solver for Multi-GPU Based HPC Architectures." *The 50th International Conference on Parallel Processing*, Chicago, Illinois, USA, Aug. 9-12, 2021

- **[J6]** Xin Liang, Ben Whitney, **Jieyang Chen**, Lipeng Wan, Qing Liu, Dingwen Tao, James Kress, Dave Pugmire, Matthew Wolf, Norbert Podhorszki, Scott Klasky. MGARD+: Optimizing Multilevel Methods for Error-bounded Scientific Data Reduction. *IEEE Transactions on Computers*, Published in 2021

- **[C25]** Jiannan Tian, Cody Rivera, Sheng Di, **Jieyang Chen**, Xin Liang, Dingwen Tao, and Franck Cappello. Revisiting Huffman Coding: Toward Extreme Performance on Modern GPU Architectures. *35th IEEE International Parallel and Distributed Processing Symposium*, Portland, Oregon, USA, May 2021

- **[C24]** Huizhang Luo, Junqi Wangy, Qing Liu, **Jieyang Chen**, Scott Klasky, Norbert Podhorszki, zMesh: Exploring Application Characteristics to Improve Lossy Compression Ratio for Adaptive Mesh Refinement. *35th IEEE International Parallel and Distributed Processing Symposium*, Portland, Oregon, USA, May 2021

- **[C23] Jieyang Chen**, Lipeng Wan, Xin Liang, Ben Whitney, Qing Liu, David Pugmire, Nicholas Thompson, Jong Youl Choi, Matthew Wolf, Todd Munson, Ian Foster, Scott Klasky. Accelerating Multigrid-based Hierarchical Scientific Data Refactoring on GPUs. *35th IEEE International Parallel and Distributed Processing Symposium*, Portland, Oregon, USA, May 2021.

- **[J5]** Cody Rivera, **Jieyang Chen**, Nan Xiong, Jing Zhang, Shuaiwen Leon Song, Dingwen Tao. TSM2X: High-performance tall-and-skinny matrix–matrix multiplication on GPUs. *Elsevier Journal of Parallel and Distributed Computing (JPDC)*, Published in 2021

- **[J4]** Kai Zhao, Sheng Di, Sihuan Li, Xin Liang, Yujia Zhai, **Jieyang Chen**, Kaiming Ouyang, Zizhong Chen, and Franck Cappello. FT-CNN: Algorithm-Based Fault Tolerance for Convolutional Neural Networks. *IEEE TPDS Special Section on Parallel and Distributed Computing Techniques for AI/ML/DL*, Published in 2021

- **[C22]** Igor Yakushin, Kshitij Mehta, **Jieyang Chen**, Matthew Wolf, Ian Foster, Scott Klasky, Todd Munson. Feature-preserving Lossy Compression for In Situ Data Analysis. *49th International Conference on Parallel Processing-ICPP: Workshops*, Edmonton, AB, Canada, Aug. 17-20,

2020

- **[C21]** Lipeng Wan, Matthew Wolf, Feiyi Wang, Jong Youl Choi, George Ostrouchov, **Jieyang Chen**, Norbert Podhorszki, Jeremy Logan, Kshitij Mehta, Scott Klasky, Dave Pugmire. I/O Performance Characterization and Prediction through Machine Learning on HPC Systems. *Cray User Group Conference*, 2020

- **[C20]** Bingbing Li, Santosh Pandey, Haowen Fang, Yanjun Lyv, Ji Li, **Jieyang Chen**, Mimi Xie, Lipeng Wan, Hang Liu, Caiwen Ding. FTRANS: energy-efficient acceleration of transformers using FPGA. *the ACM/IEEE International Symposium on Low Power Electronics and Design*, Aug. 10 - 12, 2020

- **[C19]** Zhenbo Qiao, Qing Liu, Norbert Podhorszki, Scott Klasky, **Jieyang Chen**. Taming I/O Variation on QoS-Less HPC Storage: What Can Applications Do? *Proceedings of the 32nd ACM/IEEE International Conference for High Performance Computing, Networking, Storage and Analysis*, Atlanta, Georgia, USA, Nov. 2020 Acceptance Rate: 25.1% (95/378)

- **[C18]** David Pugmire, James Kress, **Jieyang Chen**, Hank Childs, Jong Choi, Dmitry Ganyushin, Berk Geveci, Mark Kim, Scott Klasky, Xin Liang, Jeremy Logan, Nicole Marsaglia, Kshitij Mehta, Norbert Podhorszki, Caitlin Ross, Eric Suchyta, Nick Thompson, Steven Walton, Lipeng Wan, and Matthew Wolf. Visualization as a Service for Scientific Data. *Smoky Mountains Computational Science and Engineering Conference*, 2020

- **[J3]** Zhenlu Qin, Jinzhen Wang, Qing Liu, **Jieyang Chen**, Dave Pugmire, Norbert Podhorszki, Scott Klasky. Estimating Lossy Compressibility of Scientific Data Using Deep Neural Networks. *IEEE Letters of the Computer Society*, Published in 2020

- **[J2]** Jeremy Logan, Mark Ainsworth, Chuck Atkins, **Jieyang Chen**, Jong Choi, Junmin Gu, James Kress, Greg Eisenhauer, Berk Geveci, William Godoy, Mark Kim, Tahsin Kurc, Qing Liu, Kshitij Mehta, George Ostrouchov, Norbert Podhorzski, David Pugmire, Eric Suchyta, Nicolas Thompson, Ozan Tugluk, Lipeng Wan, Ruonan Wang, Ben Whitney, Matthew Wolf, Kesheng Wu, Scott Klasky. Extending the Publish/Subscribe Abstraction for High-Performance I/O and Data Management at Extreme Scale. *IEEE The Bulletin of the Technical Committee on Data Engineering*, Published in 2020

- **[C17]** Sihuan Li, Hongbo Li, Xin Liang, **Jieyang Chen**, Elisabeth Giem, Kaiming Ouyang, Kai Zhao, Sheng Di, Franck Cappello, and Zizhong Chen. FT-iSort: Efficient Fault Tolerance for Introsort, *Proceedings of the 31st ACM/IEEE International Conference for High Performance Computing, Networking, Storage and Analysis(SC)*, Denver, Colorado, USA, Nov. 17 - 22, 2019. Acceptance Rate: 20.9% (72/344)

- **[C16]** **Jieyang Chen**, Nan Xiong, Xin Liang, Dingwen Tao, Sihuan Li, Kaiming Ouyang, Nathan DeBardeleben, Qiang Guan, Zizhong Chen. TSM2: Optimizing Tall-and-skinny Matrix-Matrix Multiplication on GPUs. *33rd ACM International Conference on Supercomputing (ICS)*, Phoenix, Arizona, USA, Jun. 26-28, 2019, Acceptance Rate: 23.3% (45/193)

- **[C15]** **Jieyang Chen**, David Pugmire, Matthew Wolf, Nicholas Thompson, Jeremy Logan,Kshitij Mehta, Lipeng Wan, Jong Youl Choi, Ben Whitney, Scott Klasky. Understanding Performance-Quality Trade-offs in Scientific Visualization Workflows with Lossy Compression, *The 5th International Workshop on Data Reduction for Big Scientific Data (DRBSD)*, Denver, Colorado, USA, Nov. 17, 2019

- **[C14]** Jong Youl Choi, Jeremy Logan, Kshitij Mehta,Eric Suchyta, William Godoy, Nicholas Thompson, Lipeng Wan, **Jieyang Chen**, Norbert Podhorszki, Matthew Wolf, Scott Klasky, Julien Dominski and Choong-Seock Chang. A Co-Design Study Of Fusion Whole DeviceModeling Using Code Coupling, *The 5th International Workshop on Data Reduction for Big Scientific Data (DRBSD)*, Denver, Colorado, USA, Nov. 17, 2019

- **[C13]** Bo Fang, **Jieyang Chen**, Karthik Pattabiraman, Matei Ripeanu, Sriram Krishnamoorthy. Towards Predicting the Impact of Roll-Forward Failure Recovery for HPC Applications, *the 49th Annual IEEE/IFIP International Conference on Dependable Systems and Networks*, Portland, Oregon, USA, Jun. 24 – 27, 2019

- **[J1]** Ang Li, Shuaiwen Leon Song, **Jieyang Chen**, Jiajia Li, Xu Liu, Nathan Tallent, and Kevin Barker. Evaluating Modern GPU Interconnect: PCIe, NVLink, NV-SLI, NVSwitch and GPUDirect. *IEEE Transactions on Parallel and Distributed Systems*, Published in 2019

- **[C12] Jieyang Chen**, Qiang Guan, Xin Liang, Paul Bryant, Patricia Grubel, Allen McPherson, Li-Ta Lo, Timothy Randles, Zizhong Chen and James Ahrens. Build and Execution Environment (BEE): an Encapsulated Environment Enabling HPC Applications Running Everywhere. *Proceedings of the 2018 IEEE International Conference on Big Data* Seattle, WA, USA, Dec. 10-13, 2018. Acceptance Rate: 18.9% (98/518)

- **[C11]** Ang Li, Shuaiwen Leon Song, **Jieyang Chen**, Xu Liu, Nathan Tallent, Kevin Barker. Tartan: Evaluating Modern GPU Interconnect via a Multi-GPU Benchmark Suite, *2018 IEEE International Symposium on Workload Characterization (IISWC)*, Raleigh, North Carolina, USA, Sept. 30-Oct. 2, 2018

- **[C10] Jieyang Chen**, Hongbo Li, Sihuan Li, Panruo Wu, Xin Liang, Dingwen Tao, Kaiming Ouyang, Yuanlai Liu, Kai Zhao, Qiang Guan, and Zizhong Chen. Fault Tolerant Dense Matrix Decomposition on Heterogeneous Systems with GPUs, *Proceedings of the 30th ACM/IEEE International Conference for High Performance Computing, Networking, Storage and Analysis*, Dallas, Texas, USA, Nov. 11 - 16, 2018. Acceptance Rate: 19.1% (55/288)

- **[C9] Jieyang Chen**, Qiang Guan, Zhao Zhang, Xin Liang, Louis James Vernon, Allen McPherson, Li-Ta Lo, Patricia Grubel, Tim Randles, Zizhong Chen, and James Paul Ahrens. `BeeFlow` : A Workflow Management System for In-Situ Processing Across HPC and Cloud Systems, *38th IEEE International Conference on Distributed Computing Systems*, Jul. 2 – 5, 2018, Vienna, Austria. Acceptance Rate: 20.6% (78/378)

- **[C8]** Xin Liang, **Jieyang Chen**, Dingwen Tao, Sihuan Li, Panruo Wu, Hongbo Li, Kaiming Ouyang, Yuanlai Liu, Fengguang Song, and Zizhong Chen. Correcting Soft Errors Online in Fast Fourier Transform, *Proceedings of the 29th ACM/IEEE International Conference for High Performance Computing, Networking, Storage and Analysis*, Denver, Colorado, USA, Nov. 12 - 17, 2017. Acceptance Rate: 18.6% (61/327)

- **[C7]** Panruo Wu, Qiang Guan, Nathan DeBardeleben, Sean Blanchard, **Jieyang Chen**, Dingwen Tao, Xin Liang, Sihuan Li, Kaiming Ouyang, and Zizhong Chen. Silent Data Corruption Resilient Two-sided Matrix Factorizations, *Proceedings of the 22nd ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming*, Austin, Texas, USA, Feb. 4 - 8 2017. Acceptance Rate: 21.9% (29/132)

- **[C6] Jieyang Chen***, Li Tan*, Panruo Wu, Dingwen Tao, Hongbo Li, Xin Liang, Sihuan Li, Rong Ge, Laxmi Bhuyan, and Zizhong Chen. GreenLA: Green Linear Algebra Software for GPU-Accelerated Heterogeneous Computing, *Proceedings of the 28th ACM/IEEE International Conference for High Performance Computing, Networking, Storage and Analysis*, Salt Lake City, Utah, USA, Nov. 13 - 18, 2016. Acceptance Rate: 18.4% (82/446). *Authors contributed equally

- **[C5] Jieyang Chen**, Xin Liang, and Zizhong Chen. Online Algorithm-Based Fault Tolerance for Cholesky Decomposition on Heterogeneous Systems with GPUs, *Proceedings of the 30th IEEE International Parallel & Distributed Processing Symposium*, Chicago, Illinois, USA, May 23 - 27, 2016. Acceptance Rate: 22.98% (114/496)

- **[C4]** Panruo Wu, Nathan DeBardeleben, Qiang Guan, Sean Blanchard, Dingwen Tao, Xin Liang, **Jieyang Chen**, and Zizhong Chen. Towards Practical Algorithm Based Fault Tolerance in Dense

Linear Algebra, *Proceedings of the 25th ACM International Symposium on High-Performance Parallel and Distributed Computing*, Kyoto, JAPAN, May 31- Jun. 4, 2016. Acceptance Rate: 15.5% (20/129)

- **[C3] Jieyang Chen**, Sihuan Li, and Zizhong Chen. GPU-ABFT: Optimizing algorithm-based fault tolerance for heterogeneous systems with GPUs, *IEEE International Conference on Networking, Architecture and Storage (NAS)*, Long Beach, CA, Aug. 8 - 10, 2016
- **[C2]** Teresa Davies, Xin Liang, **Jieyang Chen**, Zizhong Chen. Simulated Annealing to Generate Numerically Stable Real Number Error Correction Codes, *Proceedings of the 2015 IEEE 17th International Conference on High Performance Computing and Communications, 2015 IEEE 7th International Symposium on Cyberspace Safety and Security, and 2015 IEEE 12th International Conference on Embedded Software and Systems*, New York, USA, Aug. 24 - 26, 2015
- **[C1] Jieyang Chen** and Zizhong Chen. Cholesky Factorization on Heterogeneous CPU and GPU Systems, *9th IEEE International Conference on Foundations of Computer Science & Technology*, Dailian, China, Aug. 26 - 28, 2015

## PEER REVIEW SERVICE

Review board member:

- IEEE Transactions on Parallel and Distributed Systems (2021 - present)

Reviewer/Committee:

- IEEE/ACM International Conference for High Performance Computing, Networking, Storage, and Analysis 2018
- IEEE International Green and Sustainable Computing Conference 2018
- Elsevier Sustainable Computing, Informatics and Systems 2019
- IEEE Access 2019
- Elsevier Journal of Systems Architecture 2019
- IEEE Workshop on Silicon Errors in Logic – System Effects 2020
- Elsevier Journal of Systems Architecture 2020
- ACM Transactions on Knowledge Discovery from Data 2020
- China Visualization and Visual Analytics Conference 2020
- IEEE International Conference on High Performance Computing and Communications 2020
- IEEE International Conference on Cluster Computing 2020
- IEEE International Workshop on Big Data Reduction 2020
- ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming 2020
- IEEE International Parallel and Distributed Processing Symposium 2021
- IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems 2021
- IEEE International Conference on Distributed Computing Systems 2021
- IEEE Workshop on Silicon Errors in Logic – System Effects 2021
- IEEE International Conference on Scalable Computing and Communications 2021
- IEEE International Workshop on Big Data Reduction 2021

- ACM International Conference on Parallel Processing 2021
- ACM International Conference on Supercomputing 2021
- IEEE International Conference on High Performance Computing and Communications 2021
- IEEE International Workshop on Data Analysis and Reduction for Big Scientific Data 2021
- International Journal of High Performance Computing Applications 2022
- IEEE Transactions on Parallel and Distributed Systems 2022
- IEEE Workshop on Silicon Errors in Logic – System Effects 2022
- International Journal of Computing and Digital Systems 2022
- ACM Transactions on Embedded Computing Systems 2022
- IEEE Access 2022
- Mobile Information Systems 2022
- Elsevier Parallel Computing 2022
- ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming 2022
- IEEE International Workshop on Data Analysis and Reduction for Big Scientific Data 2022
- IEEE International Conference on High Performance Big Data and Intelligent Systems 2022
- International Journal of Aerospace Engineering 2022
- International Workshop on In Situ Infrastructures for Enabling Extreme-scale Analysis and Visualization 2022

## TALKS AND PRESENTATIONS

**Accelerating Multigrid-based Hierarchical Scientific Data Refactoring on GPUs.** 05/2021
*35th IEEE International Parallel and Distributed Processing Symposium* *Virtual*

**Progressive Visualization via Hierarchical Scientific Data Refactoring on GPUs.** 04/2021
*US Department of Energy Computer Graphics Forum* *Virtual*

**Understanding Performance-Quality Trade-offs in Scientific Visualization Workflows with Lossy Compression,** 11/2019
*The 5th International Workshop on Data Reduction for Big Scientific Data* *Denver, CO*

**TSM2: Optimizing Tall-and-skinny Matrix-Matrix Multiplication on GPUs** 06/2019
*33rd ACM International Conference on Supercomputing* *Phoenix, AZ*

**Fault tolerant and Energy Efficient One-sided Matrix decompositions on heterogeneous systems with GPUs** 03/2019
*Ph.D. Dissertation Defence* *Riverside, CA*

**High Performance Computing at Extreme Scale: Resilience, Energy Efficiency, and Performance** 02/2019
*New Mexico State University* *Las Cruces, NM*

**High Performance Computing at Extreme Scale: Resilience, Energy Efficiency, and Performance** 02/2019
*Oak Ridge National Laboratory* *Oak Ridge, TN*

**High Performance Computing at Extreme Scale: Resilience, Energy Efficiency, and Performance** 02/2019
*Tennessee Tech University* *Cookville, TN*

**High Performance Computing at Extreme Scale: Resilience, Energy Efficiency, and Performance** 02/2019
*San Francisco State University* *San Francisco, CA*

**Build and Execution Environment (BEE): an Encapsulated Environment Enabling HPC Applications Running Everywhere.** 12/2018
*Proceedings of the 2018 IEEE International Conference on Big Data* *Seattle, WA*

**Fault Tolerant Matrix Decomposition on Heterogeneous Systems with GPUs** 12/2018
*ACM/IEEE Supercomputing conference* *Dallas, TX*

**High Performance Computing at Extreme Scale: Resilience, Energy Efficiency, and Performance** 04/2018
*Southern Illinois University* *Carbondale, IL*

**GreenLA: Green Linear Algebra Software for GPU-Accelerated Heterogeneous Computing** 11/2016
*ACM/IEEE Supercomputing conference* *Salt Lake City, UT*

**Online Algorithm-Based Fault Tolerance for Cholesky Decomposition on Heterogeneous Systems with GPUs** 05/2016
*Proceedings of the 30th IEEE International Parallel & Distributed Processing Symposium Chicago, IL*

## SOFTWARE

**MGARD-X: Multigrid-based Adaptive Scientific Data Reduction for Exascal Scientific Computing**

· Link: github.com/CODARCode/MGARD

**Tartan: benchmark suite for evaluating modern GPU interconnect**

· Link: github.com/uuudown/Tartan

**BEE: containerized scientific in situ workflow management system for HPC applications**

· Link: github.com/lanl/BEE

## RESEARCH FUNDING AWARDS

**ESAMR: Enabling Scalable Analytics using Multiprecision Refactoring** 10/2020-09/2022
*Awarded amount: $640,000/2 yrs (Role: PI)* *DOE/ORNL Directed Research & Development*

## TECHNICAL SKILLS

| | |
|---|---|
| **Programming Languages** | C/C++, CUDA (C/ptx), Python, Java, MATLAB, Shell Script |
| **Software & Tools** | Paraview, VisIt, VTK-m, ADIOS, MGARD, SZ, ZFP, Docker, QEMU/KVM, LAPACK, MAGMA, cuBLAS, cuLA. |