

## Matthew L. Curry, Ph.D.

Matthew L. Curry is a Senior Member of Technical Staff at Sandia National Laboratories. His primary areas of research include extreme-scale file and storage systems, application of erasure coding algorithms and other data safety algorithms to storage, heterogeneous computing, and characteristics of low-level storage devices. He has given invited lectures at EMC, the University of Alabama at Birmingham, and Auburn University.

### Program Committees

- The 7th Parallel Data Storage Workshop, held in conjunction with Supercomputing 2012.
- The 28th IEEE Conference on Massive Data Storage (MSST 2012)
- The 4th International Workshop on Frontiers of Heterogeneous Computing (FHC 2013)

### Reviewing Activities

He performs several reviews a year for the following journals:

- ACM Transactions on Storage
- ACM Transactions on Parallel Computing
- Concurrency and Computation, Practice and Experience

### Education and Training

- Ph.D., Computer and Information Sciences, University of Alabama at Birmingham, December 2010.
- M.S., Computer and Information Sciences, University of Alabama at Birmingham, May 2008.
- B.S., Computer and Information Sciences, University of Alabama at Birmingham, December 2004.

### Research and Professional Experience

- **Senior Member of Technical Staff, Scalable System Software, Sandia National Laboratories**, 2010-Present. Performing research and development activities associated with high-performance storage and operating systems for massively parallel computing systems.
- **Systems Analyst, Department of Computer and Information Sciences, University of Alabama at Birmingham**, January 2009 - May 2009. Supported research software development activities for NSF Award CNS-0821497, “MRI: Development of a GPU-Enabled Integrated Storage Computation Architecture and System.”
- **Student Intern, Sandia National Laboratories**, Summers 2005-2008 and May 2009-December 2010. Performed research and development activities associated with high-performance storage and operating systems for massively parallel computing systems.
- **Teaching and Research Assistant, Department of Computer and Information Sciences, University of Alabama at Birmingham**, during spring and fall semesters beginning January 2005 and ending May 2009. Performed research, taught courses (Operating Systems, Introduction to C++), gave guest lectures (Parallel Computing, Software Engineering), graded, and conducted labs.

### Publications

1. *Gibraltar: A Reed-Solomon Coding Library for Storage Applications on Programmable Graphics Processors*. Matthew L. Curry, Anthony Skjellum, H. Lee Ward, Ron Brightwell (2011). Concurrency and Computation, Practice and Experience, Volume 23, Issue 18 (pages 2477-2495).

2. *GPUstore: Harnessing GPU Computing for Storage Systems in the OS Kernel*. Weibin Sun, Robert Ricci, Matthew L Curry. The 5th Annual International Systems and Storage Conference (SYSTOR 2012).
3. *A Lightweight, GPU-Based Software RAID System*. Matthew L. Curry, H. Lee Ward, Anthony Skjellum, Ron Brightwell. International Conference on Parallel Processing (ICPP) 2010.
4. *Accelerating Reed-Solomon coding in RAID systems with GPUs*. Matthew L. Curry, Anthony Skjellum, H. Lee Ward, Ron Brightwell. IEEE International Parallel and Distributed Processing Symposium (IPDPS) 2008.
5. *Power Use of Disk Subsystems in Supercomputers*. Matthew L. Curry, H. Lee Ward, Gary Grider, Jill Gemmill, Jay Harris, David Martinez (2011). Proceedings, 6th Parallel Data Storage Workshop, Seattle, Washington.
6. *Failing in Place for Low-Serviceability Infrastructure Using High-Parity GPU-Based RAID*. Matthew L. Curry, H. Lee Ward, Anthony Skjellum, High Performance Embedded Computing Workshop (HPEC) 2010.
7. *Using GPUs to Enable Highly Reliable Embedded Storage*. Matthew L. Curry, Anthony Skjellum, Lee Ward, Ron Brightwell. HPEC 2008. September 24, 2008.
8. *Arbitrary Dimension Reed-Solomon Coding and Decoding for Extended RAID on GPUs*. Matthew L. Curry, H. Lee Ward, Anthony Skjellum, Ron Brightwell. 3rd Petascale Data Storage Workshop held in conjunction with SC08, Austin, TX. Nov. 17, 2008.
9. *Using the Sirocco File System for High-Bandwidth Checkpoints*. Matthew L. Curry, Ruth Klundt, H. Lee Ward. Technical Report. SAND2012-1087.
10. *A Highly Reliable GPU-based RAID System*. Matthew L. Curry. Doctoral thesis, University of Alabama at Birmingham, 2010, 141 pages. Available online: <http://www.mhsl.uab.edu/dt/2010p/curry.pdf>.

## Synergistic Activities

- Member of the Board of Directors for the New Mexico Supercomputing Challenge (<http://www.supercomputingchallenge.org/about/>).
- Sandia POC for the DOE Storage Fast-Forward 2 effort.

## Collaborators/Conflicts of Interest

Purushotham V. Bangalore, University of Alabama at Birmingham (collaborator). Ron Brightwell, Sandia National Laboratories (co-author, collaborator). Phil Carns, Argonne National Laboratory (co-author, collaborator). Geoff Danielson, Sandia National Laboratories (collaborator). Jill Gemmill, Clemson University (co-author). Kevin Harms, Argonne National Laboratory (co-author). Jay Harris, Clemson University (co-author). Dries Kimpe, Argonne National Laboratory (co-author, collaborator). Ruth Klundt, Sandia National Laboratories (co-author). Thomas Kroeger, Sandia National Laboratories (collaborator). Darrell Long, University of California-Santa Cruz (collaborator). Carlos Maltzahn, University of California-Santa Cruz (co-author, collaborator). Ethan Miller, University of California-Santa Cruz (collaborator). Ron Oldfield, Sandia National Laboratories (collaborator). David R. Resnick, Sandia National Laboratories (co-author). Robert Ricci, University of Utah (co-author). Robert Ross, Argonne National Laboratory (co-author, collaborator). Haiying Shen, Clemson University (collaborator). Anthony Skjellum, Auburn University (co-author, collaborator, Ph.D. advisor). Weibin Sun, Google (co-author). Zhiwei Sun, Data Direct Networks (co-author, collaborator). Lee Ward, Sandia National Laboratories (co-author, collaborator).