Michael J. Brim

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Education

Ph.D. in Computer Sciences   University of Wisconsin-Madison, 2012

Minor: Business (Information Systems)

Dissertation: *Control and Inspection of Distributed Process Groups at Extreme Scale via Group File Semantics*

M.S. in Computer Sciences   University of Wisconsin-Madison, 2003

B.S. in Computer Science   Ohio Northern University, 2000

Minors: Business, Mathematics

Experience

Research Associate – Computer Science & Mathematics Division, Oak Ridge National Laboratory   2012 – present

Research Assistant – Computer Sciences Department, University of Wisconsin-Madison   2001 – 2012

Research Scientist – Computer Science & Mathematics Division, Oak Ridge National Laboratory   2000 – 2001

Selected Publications

- J. Reed, J. Archuleta, M.J. Brim, and J. Lothian, "Evaluation Dynamic File Striping for Lustre", *International Workshop on the Lustre Ecosystem: Challenges and Opportunities*, Annapolis, Maryland, 2015.

- M.J. Brim and J.K. Lothian, "Monitoring Extreme-scale Lustre Toolkit", *International Workshop on the Lustre Ecosystem: Challenges and Opportunities*, Annapolis, Maryland, 2015.

- M.J. Brim, D.A. Dillow, S. Oral, B.W. Settlemyer, and F. Wang, "Asynchronous Object Storage with QoS for Scientific and Commercial Big Data", *8th Parallel Data Storage Workshop (PDSW)*, Denver, Colorado, 2013.

- D.H. Ahn, M.J. Brim, B.R. de Supinski, T. Gamblin, G.L. Lee, M.P. Legendre, B.P. Miller, A. Moody, and M. Schulz, "Efficient and Scalable Retrieval Techniques for Global File Properties", *IEEE International Parallel and Distributed Processing Symposium (IPDPS)*, Boston, Massachusetts, 2013.

- M.J. Brim, B.P. Miller, and V. Zandy, "FINAL: Flexible and Scalable Composition of File System Name Spaces", *ACM Workshop on Runtimes and Operating Systems for Supercomputers (ROSS)*, Tucson, Arizona, 2011.

- M.J. Brim, L. DeRose, B.P. Miller, R. Olichandran, and P.C. Roth, "MRNet: A Scalable Infrastructure for Development of Parallel Tools and Applications", *Cray User Group (CUG)*, Edinburgh, Scotland, 2010.

- E.R. Jacobson, M.J. Brim, and B.P. Miller, "A Lightweight Library for Building Scalable Tools", *Para2010: State of the Art in Scientific and Parallel Computing*, Reykjavík, Iceland, 2010.

- M.J. Brim and B.P. Miller, "Group File Operations for Scalable Tools and Middleware", *16th IEEE*

International Conference on High Performance Computing (HiPC), Cochin, India, 2009. (**Best Paper)**

- M. Brim, R. Flanery, A. Geist, B. Luethke, and S. Scott, "Cluster command & control (c3) tool suite", *Parallel and Distributed Computing Practices* **4**, 4, Nova Science Publishers, 2001.
- M. Brim, A. Geist, B. Luethke, J. Scwidder, and S.L. Scott, "M3C: Managing and monitoring multiple clusters", *1st ACM/IEEE International Symposium on Cluster Computing and the Grid (CCGrid 2001)*, Brisbane, Australia, 2001.

Research Experience

- **Computer Science Research Group, ORNL**: Current research seeks to identify and eliminate deficiencies in the scalability, performance, and resiliency of applications, tools, middleware, and systems software for extreme-scale distributed systems, with a particular focus on next-generation production HPC systems.   2012 – present

- **Paradyn Group, UW-Madison**: Investigated methods and techniques for scalable performance analysis of applications and systems. Focus areas included dynamic instrumentation of applications and commodity operating systems, scalable communication and data aggregation frameworks, and novel paradigms for scalable group operations on distributed files.   2001 – 2012

- **ORNL**: Performed various research related to cluster computing. Projects included evaluating and developing cluster administration tools (C3, OSCAR), and benchmarking Gigabit Ethernet network technologies.   2000 – 2001

Teaching Experience

- Teaching Assistant, Information Systems, University of Wisconsin-Madison   2005 – 2006

- OSCAR Tutorial, Linux Clusters: The HPC Revolution Conference   June 2001

- Teaching Assistant, Computer Science, Ohio Northern University   1998 – 2000

Selected Presentations

- "The Evolution of Scalable Shared Storage", Invited seminar presentation at U.S. Naval Academy   March 2015

- "Overview of Performance Tools on Titan", Argonne Training Program on Extreme-Scale Computing   August 2013

- "The Titan Tools Experience", Petascale Tools Workshop — July 2013
- "TBON-FS Name Space Aggregation", FAST-OS BOF, SC 2009 — November 2009
- "TBON-FS: Scalable Group File Operations", FAST-OS Workshop, ICS 2009 — June 2009
- "Scalable Distributed Process Group Control and Inspection via the File System", TCPP Ph.D. Forum, IPDPS 2009 — May 2009

Affiliations/Memberships

- **ACM** – ONU Student Chapter (VP 2000) and Regional Programming Contest Team (1998, 1999), UW-Madison Student Chapter, Professional Member (SIGOPS, SIGHPC) — 1998 – present
- **IEEE** – Professional and Computer Society Member — 2011 – present
- **USENIX** — 2008 – 2009

Professional Activities

- **Program Chair**: 2015 International Workshop on the Lustre Ecosystem.
- **Technical Program Committee**: Cluster 2015; DISCS Workshop 2015; IPDPS 2013.
- **Paper Reviewer**: Computation and Concurrency: Practice and Experience (Scalable Tools for High-End Computing) 2009; EuroPVM/MPI 2005,2006; HPDC 2007; IPDPS 2007; LCI-ICC 6,7; PACT 2009; SC 2007,2008.

Research Interests

- Scalable tools for administration, debugging, monitoring, and performance analysis of distributed applications and systems
- Distributed and parallel file systems, distributed data and object stores, and BigData infrastructures for use in data-intensive scientific and commercial workloads
- Operating and runtime systems for extreme-scale distributed- and shared-memory computers

Technical Skills

- **Programming Languages**: proficient in C, C++, Unix Shell (awk, bash, csh, sed); prior development experience using Ada, ASP.Net, Boost C++, C#, HTML, Lisp, Perl, Python, SQL, Visual Basic/C++
- **Parallel Programming Models**: CUDA, MapReduce, OpenACC, OpenMP, POSIX threads
- **Network Communication Layers**: MPI, MRNet, SNOflake, Sockets (TCP, UDP)

- **Software Development**: CVS, Emacs, git, make, Subversion, Vim

- **Debugging Tools**: DDT, gdb, TotalView

- **Performance Analysis Tools**: CrayPAT, HPCToolkit, Open|SpeedShop, TAU, Vampir