PAVAN BALAJI

Mathematics and Computer Science (MCS) Division, Argonne National Laboratory (ANL)
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EDUCATION

Ph.D., Computer Science and Engg., Ohio State University	2006
M.S., Computer Science and Engg., Ohio State University	2003
B.Tech., Computer Science and Engg., Indian Institute of Technology (IIT), Madras	2001

APPOINTMENTS

Argonne National Laboratory, Argonne, IL

Group Lead	2012 – present
Computer Scientist	2012 – present
Assistant Computer Scientist	2008 – 2011
Post-doctoral Researcher	2006 – 2008

Northwestern-Argonne Institute of Science and Engineering, Northwestern University, Chicago, IL

Institute Fellow	2012 – present

Computation Institute, University of Chicago, Chicago, IL

Fellow	2007 – present

RESEARCH INTERESTS

My research broadly falls into the general areas of parallel and distributed computing. Specifically, I focus on the following areas: (i) parallel programming models and runtime systems (MPI, global address space models, task parallel models, sockets, file-systems, web-based data-center middleware); (ii) large-scale computing systems and other exotic architectures (Blue Gene, Cray, multi-core systems, GPUs and other accelerators), (iii) high-speed interconnects (InfiniBand, High-speed Ethernet); (iv) cloud computing systems and virtualization, and (v) job scheduling and resource management (QoS, parameter sweep applications).

TEACHING

1. *Illinois Institute of Technology (IIT), Chicago, USA.*
   (a) *CS 546: Parallel and Distributed Processing.* Guest lecture series. Course Instructor: Zhiling Lan (Illinois Institute of Technology). Spring 2013.
   (b) *CS 597: Independent Study (Christian Roehrig).* Jointly with Xian-He Sun (Illinois Institute of Technology). Fall 2012.
   (c) *CS 597: Independent Study (Christian Roehrig).* Jointly with Xian-He Sun (Illinois Institute of Technology). Summer 2012.
   (d) *CS 546: Parallel and Distributed Processing.* Jointly with Xian-He Sun (Illinois Institute of Technology) and Rajeev S. Thakur (Argonne National Laboratory). Spring 2012.

KEY ACTIVITIES, AWARDS AND ACCOMPLISHMENTS

1. *Crain's Chicago Business' Annual 40 Under 40 Award.* Chicago, IL, 2012.
2. *U.S. Department of Energy (DOE) Early Career Award.* 2012.
3. *IEEE Technical Committee on Scalable Computing (TCSC) Chair.* Term: 2012–2013.
4. *Outstanding Paper Award.* European PVM/MPI Users' Group Conference (Euro PVM/MPI). Espoo, Finland, 2009.
5. *Best Paper Award.* International Supercomputing Conference (ISC). Hamburg, Germany, 2009.
6. *Best Paper Award.* IEEE International Conference on Cluster Computing (Cluster). Tsukuba, Japan, 2008.
7. *Outstanding Paper Award.* European PVM/MPI Users' Group Conference (Euro PVM/MPI). Dublin, Ireland, 2008.
8. *Outstanding Paper Award.* International Supercomputing Conference (ISC). Dresden, Germany, 2008.
9. *Storage Challenge Award (Large Systems Category).* IEEE/ACM International Conference for High-Performance Computing, Networking, Storage and Analysis (SC). Reno, Nevada, 2007.
10. *Los Alamos Director's Technical Achievement Award.* Los Alamos National Laboratory. Los Alamos, New Mexico, 2005.
11. *Outstanding Research Award of Excellence.* Computer Science and Engineering, Ohio State University. Columbus, Ohio, 2005.

RESEARCH GRANTS AND DONATIONS

Funding Grants

1. **Co-PI** (PI: Mohammad Javad Rashti, RNet Technologies): *Virtual Accelerator Support for High Performance Computing Clouds.* Department of Energy (DOE), Small Business Technology Transfer (STTR) program. Period: 02/19/2013 to 02/18/2014. Argonne Amount (collaborative grant): $75,000.
2. **PI:** *Open GATS: An Open Unified Framework for Global Address and Task Space Computing in the Exascale Era (renewal).* Argonne National Laboratory, Laboratory Directed Research and Development (LDRD) program. Period: 10/01/2012 to 07/31/2013. Amount (single institute grant): $100,000.
3. **Co-PI** (PI: Rajeev S. Thakur, Argonne National Laboratory): *Runtime Support for Integrating MPI and Accelerator Programming Models for Exascale Systems (renewal).* Argonne National Laboratory, Laboratory Directed Research and Development (LDRD) program. Period: 10/01/2012 to 09/30/2013. Amount (single institute grant): $100,000.
4. **Co-PI** (PI: Peter H. Beckman, Argonne National Laboratory): *Exploring a New Approach for Parallel Programming at Exascale*. Argonne National Laboratory, Laboratory Directed Research and Development (LDRD) program. Period: 10/01/2012 to 09/30/2013. Amount (single institute grant): $200,000.
5. **Co-PI** (PI: Ewing L. (Rusty) Lusk, Argonne National Laboratory): *System Software for Scalable Applications*. National Science Foundation (NSF), Petascale Computing Resource Allocations (PRAC) program. Period: 06/01/2012 to 05/31/2013. Amount (single institute grant): $75,000.
6. **Co-PI** (PI: Rajeev S. Thakur, Argonne National Laboratory): *Evolving MPI to Address the Challenges of Exascale Systems*. Department of Energy (DOE), Advanced Scientific Computing Research (ASCR), Base program. Period: 10/01/2012 to 09/30/2015. Argonne amount (single institute grant): $3,000,000.
7. **Co-PI** (PI: Andrew A. Chien, University of Chicago): *Exploiting Global View for Resilience (GVR)*. Department of Energy (DOE), Advanced Scientific Computing Research (ASCR), X-Stack Software Research program. Period: 10/01/2012 to 09/30/2015. Argonne amount (collaborative grant): $765,000.
8. **PI:** *Implementation of MPICH2 over Portals 4*. Department of Energy (DOE), National Nuclear Security Administration (NNSA), Base program. Period: 06/01/2012 to 09/30/2012. Amount (single institute grant): $150,000.
9. **PI:** *Exploring Efficient Data Movement Strategies For Exascale Systems with Deep Memory Hierarchies*. Department of Energy (DOE), Advanced Scientific Computing Research (ASCR), Early Career program. Period: 07/01/2012 to 06/30/2017. Amount (single institute grant): $2,500,000.

10. **Co-PI** (PI: Marc Snir, Argonne National Laboratory): *Tools for Semi-Automatic Conversion of Current HPC Codes to a Task Parallel Model*. Department of Energy (DOE), Advanced Scientific Computing Research (ASCR), Base program. Period: 10/01/2011 to 09/30/2012. Amount (single institute grant): $2,500,000.
11. **Co-PI** (PI: Rajeev S. Thakur, Argonne National Laboratory): *Programming Libraries and Tools*. Department of Energy (DOE), Advanced Scientific Computing Research (ASCR), Base program. Period: 11/01/2011 to 09/30/2012. Amount (single institute grant): $825,000.
12. **PI:** *Open GATS: An Open Unified Framework for Global Address and Task Space Computing in the Exascale Era (renewal).* Argonne National Laboratory, Laboratory Directed Research and Development (LDRD) program. Period: 10/01/2011 to 09/30/2012. Amount (single institute grant): $300,000.
13. **Co-PI** (PI: Rajeev S. Thakur, Argonne National Laboratory): *Runtime Support for Integrating MPI and Accelerator Programming Models for Exascale Systems (renewal)*. Argonne National Laboratory, Laboratory Directed Research and Development (LDRD) program. Period: 10/01/2011 to 09/30/2012. Amount (single institute grant): $200,000.
14. **Co-PI** (PI: Robert Harrison, Oak Ridge National Laboratory): *Chemistry Exascale Co-design Center (CECC)* (planning award). Department of Energy (DOE), Advanced Scientific Computing Research (ASCR), X-Stack Software Research program. Period: 08/15/2010 to 09/30/2011. Argonne amount (collaborative grant): $50,000.
15. **PI:** *Open GATS: An Open Unified Framework for Global Address and Task Space Computing in the Exascale Era (renewal).* Argonne National Laboratory, Laboratory Directed Research and Development (LDRD) program. Period: 10/01/2010 to 09/30/2011. Amount (single institute grant): $462,000.
16. **Co-PI** (PI: Rajeev S. Thakur, Argonne National Laboratory): *Runtime Support for Integrating MPI and Accelerator Programming Models for Exascale Systems*. Argonne National Laboratory, Laboratory Directed Research and Development (LDRD) program. Period: 10/01/2010 to 09/30/2011. Amount (single institute grant): $200,000.
17. **Co-PI** (PI: Peter H. Beckman, Argonne National Laboratory): *An Open Integrated Software Stack for Extreme Scale Computing (planning award).* Department of Energy (DOE), Advanced Scientific Computing Research (ASCR), X-Stack Software Research program. Period: 08/15/2010 to 09/30/2011. Argonne amount (collaborative grant): $1,870,000.
18. **PI:** *Open GATS: An Open Unified Framework for Global Address and Task Space Computing in the Exascale Era.* Argonne National Laboratory, Laboratory Directed Research and Development (LDRD) program. Period: 07/01/2010 to 09/30/2010. Amount (single institute grant): $100,000.
19. **Co-PI** (PI: Wu-chun Feng, Virginia Tech): *Acquisition of a Heterogeneous Supercomputing Instrument for Transformative Interdisciplinary Research.* National Science Foundation (NSF), Major Research Instrumentation (MRI) program. Period: 09/01/2010 to 08/31/2015. Total amount (collaborative grant): $2,000,000.
20. **Co-PI** (PI: Dhabaleswar K. Panda, Ohio State University): *Designing Next Generation Communication and I/O Subsystems with Multicore Architectures.* National Science Foundation (NSF), Computing Processes and Artifacts (CPA) program. Period: 07/01/07 to 06/30/10. Argonne amount (collaborative grant): $87,512 (total: $462,512).
21. **PI:** *Experimental Testbed for System Software Research.* Associate Lab Director Discretionary Funds for Research and Development. Amount (single institute grant): $100,000.

Equipment Loaners

22. **PI:** *Designing MPICH2 over Qlogic InfiniBand.* Equipment loaner from Qlogic Corporation. Period: 09/2007 to present. Amount (equipment; single institute): $30,000.
23. **PI:** *10-Gigabit Ethernet Evaluation with MPI and PVFS.* Equipment loaner from Fulcrum Microsystems. Period: 12/2006 to present. Amount (equipment; single institute): $15,000.
24. **PI:** *Designing Efficient System Software Services for iWARP-enabled Clusters.* Equipment loaner from NetEffect Inc. Period: 10/2006 to 02/2008. Amount (equipment; single institute): $30,000.

Supercomputing Time

25. **Co-PI** (PI: Rob Latham, Argonne National Laboratory): *Scalable System Software for Performance and Productivity.* Department of Energy (DOE), Innovative & Novel Computational Impact on Theory and Experiment (INCITE) program. 10 million CPU hours of Supercomputing time on the Argonne Mira Blue Gene/Q system. Period: 01/01/2013 to 12/31/2013.

26. **Co-PI** (PI: Ewing L. (Rusty) Lusk, Argonne National Laboratory): *Scalable System Software for Performance and Productivity.* Department of Energy (DOE), Innovative & Novel Computational Impact on Theory and Experiment (INCITE) program. 5 million CPU hours of Supercomputing time on the Argonne Intrepid Blue Gene/P system. Period: 01/01/2012 to 12/31/2012.

27. **Co-PI** (PI: Ewing L. (Rusty) Lusk, Argonne National Laboratory): *System Software for Scalable Applications*. National Science Foundation (NSF), Petascale Computing Resource Allocations (PRAC) program. 7.5 million CPU hours of Supercomputing time on the NCSA Blue Waters system. Period: 01/01/2012 to 12/31/2015.

28. **Co-PI** (PI: Ewing L. (Rusty) Lusk, Argonne National Laboratory): *Scalable System Software for Performance and Productivity.* Department of Energy (DOE), Innovative & Novel Computational Impact on Theory and Experiment (INCITE) program. 5 million CPU hours of Supercomputing time on the Argonne Intrepid Blue Gene/P system. Period: 01/01/2011 to 12/31/2011.

29. **Co-PI** (PI: Kalyan Kumaran, Argonne National Laboratory): *Enabling Petascale Science on BG/Q: Tools, Libraries, Programming Models, & Other System Software.* Department of Energy (DOE), Early Science program. 8 million CPU hours on the Argonne Intrepid Blue Gene/P system and 25 million CPU hours on the Argonne Mira Blue Gene/Q system. Period: 01/01/2011 to 12/31/2012.

30. **Co-PI** (PI: Ewing L. (Rusty) Lusk, Argonne National Laboratory): *Scalable System Software for Performance and Productivity.* Department of Energy (DOE), Innovative & Novel Computational Impact on Theory and Experiment (INCITE) program. 5 million CPU hours of Supercomputing time each year on the Argonne Intrepid Blue Gene/P system. Period: 01/01/2010 to 12/31/2012.

31. **Co-PI** (PI: William D. Gropp, Argonne National Laboratory): *Analyzing and Profiling Asymmetric MPI Collective Communication on BGW.* Supercomputing time on the 40,960 processor Blue Gene Watson (BGW) system. Period: 11/01/2007.

SELECTED PUBLICATIONS

Book Chapters

1. James S. Dinan and Pavan Balaji. *Scalable Computing and Communications: Theory and Practice.* Chapter on *Parallel Programming Models for Scalable Computing.* Editors: Samee Ullah Khan, Lizhe Wang, and Albert Y. Zomaya. John Wiley & Sons Publishing, 2012.

2. Pavan Balaji, Darius T. Buntinas and Dries Kimpe. *Scalable Computing and Communications: Theory and Practice.* Chapter on *Fault Tolerance Techniques for Scalable Computing.* Editors: Samee Ullah Khan, Lizhe Wang, and Albert Y. Zomaya. John Wiley & Sons Publishing, 2012.

3. Pavan Balaji, Wu-chun Feng and Qian Zhu. *Scalable Computing and Communications: Theory and Practice.* Chapter on *Virtualization Techniques for Graphics Processing Units.* Editors: Samee Ullah Khan, Lizhe Wang, and Albert Y. Zomaya. John Wiley & Sons Publishing, 2012.

4. Dhabaleswar K. Panda, Pavan Balaji, Sayantan Sur and Matthew Koop. *Attaining High Performance Communication: A Vertical Approach.* Chapter on *Commodity High Performance Interconnects.* Editor: Ada Gavrilovska. CRC Press, 2009.

5. Wu-chun Feng and Pavan Balaji. *Attaining High Performance Communication: A Vertical Approach.* Chapter on *Ethernet vs. Ethernot.* Editor: Ada Gavrilovska. CRC Press, 2009.

6. Pavan Balaji, P. Sadayappan and Mohammad Kamrul Islam. *Market-Oriented Grid and Utility Computing.* Chapter on *Techniques on Providing Hard Quality of Service Guarantees in Job Scheduling.* Editors: Rajkumar Buyya and Kris Bubendorfer. Wiley Publishers, 2008.

Meeting Reports

7. Sonia R. Sachs, Katherine Yelick, Saman Amarasinghe, Mary Hall, Richard Lethin, Keshav Pingali, Dan Quinlan, Vivek Sarkar, John Shalf, Robert Lucas, Pavan Balaji, Pedro C. Diniz, Alice Koniges, and Marc Snir. *Exascale Programming Challenges Workshop Report.* The ASCR Programming Models Workshop, July, 2011. [pdf]

8. Jack A. Gilbert, Folker Meyer, Dion Antonopoulos, Pavan Balaji, Christopher T. Brown, Narayan Desai, Jonathan A. Eisen, Dick Evers, Dawn Field, Wu-chun Feng, Daniel Huson, Janet Jansson, Rob Knight, James Knight, Eugene Kolker, Kostas Konstantindis, Joel Kostka, Nikos Kyrpides, Rachel Mackelprang, Alice McHardy, Christopher Quince, Jeroen Raes, Alexander Sczyrba, Ashley Shade, and Rick Stevens. *Meeting Report: The Terabase Metagenomics Workshop and the Vision of an Earth Microbiome Project.* Institute of Computing in Science (ICiS) Workshop on the Earth Microbiome Project (EMP), 2010. [pdf]

International Standards

9. *MPI: A Message-Passing Interface Standard, Version 3.0.* The Message Passing Interface Forum, Sep. 21st, 2012. [pdf]
10. *MPI: A Message-Passing Interface Standard, Version 2.2.* The Message Passing Interface Forum, Sep. 4th, 2009. [pdf]
11. *MPI: A Message-Passing Interface Standard, Version 2.1.* The Message Passing Interface Forum, Jun. 23rd, 2008. [pdf]

Refereed Journal Articles

12. Torsten Hoefler, James S. Dinan, Darius T. Buntinas, Pavan Balaji, Brian Barrett, Ronald Brightwell, William D. Gropp, Vivek Kale and Rajeev S. Thakur. *MPI+MPI: A New, Hybrid Approach to Parallel Programming with MPI Plus Shared Memory.* Springer Journal of Computing; special issue for the Euro MPI Users' Group Meeting (Euro MPI). (accepted for publication).
13. Abhinav Vishnu, Shuaiwen Song, Andres Marquez, Kevin Barker, Darren Kerbyson, Kirk W. Cameron and Pavan Balaji. *Designing Energy Efficient Communication Runtime Systems: A View from PGAS Models.* Journal of Supercomputing (JoS). (accepted for publication). [pdf]
14. Giorgio Luigi Valentini, Walter Lassonde, Samee Ullah Khan, Nasro Min-Allah, Sajjad A. Madani, Juan Li, Limin Zhang, Lizhe Wang, Nasir Ghani, Joanna Kolodziej, Hongxiang Li, Albert Y. Zomaya, Cheng-Zhong Xu, Pavan Balaji, Abhinav Vishnu, Fredric Pinel, Jonathan E. Pecero, Dzimitry Kliazovich, and Pascal Bouvry. *An Overview of Energy Efficiency Techniques in Cluster Computing Systems.* Springer Journal of Cluster Computing; special issue on Green Computing and Communications, pp. 3-15, Vol. 16, Issue 1, 2013. [pdf]
15. Pavan Balaji, Rinku K. Gupta, Abhinav Vishnu and Peter H. Beckman. *Mapping Communication Layouts to Network Hardware Characteristics on Massive-Scale Blue Gene Systems.* Springer Journal of Computer Science on Research and Development; special issue for the International Supercomputing Conference (ISC), pp. 247-256, Vol. 26, Issue 3-4, 2011. [pdf]
16. Pavan Balaji, Darius T. Buntinas, David J. Goodell, William D. Gropp, Torsten Hoefler, Sameer Kumar, Ewing L. (Rusty) Lusk, Rajeev S. Thakur and Jesper Larsson Träff. *MPI on Millions of Cores.* Parallel Processing Letters (PPL) Journal; special issue for the Euro MPI Users' Group Meeting (Euro MPI), pp. 45–60, Vol. 21, Issue 1, 2011.
17. Pavan Balaji, Wu-chun Feng, Heshan Lin, Jeremy Archuleta, Satoshi Matsuoka, Andrew Warren, João Carlos Setubal, Ewing L. (Rusty) Lusk, Rajeev S. Thakur, Ian Foster, Daniel S. Katz, Shantenu Jha, Kevin Shinpaugh, Susan Coghlan, and Daniel A. Reed. *Global-scale Distributed I/O with ParaMEDIC.* Journal of Concurrency and Computation: Practice and Experience (CCPE), pp. 2266–2281, Vol. 22, Issue 16, 2010. [pdf]
18. Pavan Balaji, Anthony K. Chan, William D. Gropp, Rajeev S. Thakur and Ewing L. (Rusty) Lusk. *The Importance of Non-Data-Communication Overheads in MPI.* International Journal of High Performance Computing Applications (IJHPCA); special issue for the Euro MPI Users' Group Meeting (Euro MPI), pp. 5–15, Vol. 24, Issue 1, 2010.
19. Pavan Balaji, Darius T. Buntinas, David J. Goodell, William D. Gropp and Rajeev S. Thakur. *Fine-Grained Multithreading Support for Hybrid Threaded MPI Programming.* International Journal of High Performance Computing Applications (IJHPCA); special issue for the Euro MPI Users' Group Meeting (Euro MPI), pp. 49–57, Vol. 24, Issue 1, 2010.
20. Jesper Larsson Träff, Andreas Ripke, Christian Siebert, Pavan Balaji, Rajeev S. Thakur and William D. Gropp. *A Pipelined Algorithm for Large, Irregular All-gather Problems.* International Journal of High Performance Computing Applications (IJHPCA); special issue for the Euro MPI Users' Group Meeting (Euro MPI), pp. 58–68, Vol. 24, Issue 1, 2010.

21. Pavan Balaji, Anthony K. Chan, Rajeev S. Thakur, William D. Gropp and Ewing L. (Rusty) Lusk. *Toward Message Passing for a Million Processes: Characterizing MPI on a Massive Scale Blue Gene/P.* Springer Journal of Computer Science on Research and Development; special issue for the International Supercomputing Conference (ISC), pp. 11–19, Vol. 24, Issue 1, 2009. **Best Paper Award** at ISC. [pdf]

22. Ping Lai, Pavan Balaji, Rajeev S. Thakur and Dhabaleswar K. Panda. *ProOnE: A General Purpose Protocol Onload Engine for Multi- and Many-Core Architectures.* Springer Journal of Computer Science on Research and Development; special issue for the International Supercomputing Conference (ISC), pp. 133–142, Vol. 23, Issue 3, 2009. [pdf]

23. Pavan Balaji, Wu-chun Feng and Dhabaleswar K. Panda. *Bridging the Ethernet-Ethernot Performance Gap.* IEEE Micro Journal; special issue on High-Performance Interconnects, pp. 24–40, Vol. 26, Issue 3, 2006. [pdf]

24. Hyun-Wook Jin, Pavan Balaji, Chuck Yoo, Jin-Young Choi and Dhabaleswar K. Panda. *Exploiting NIC Architectural Support for Enhancing IP based Protocols on High Performance Networks.* Journal of Parallel and Distributed Computing (JPDC); special issue on Design and Performance of Networks for Super-, Cluster- and Grid-Computing, pp. 1348–1365, Vol. 65, Issue 11, 2005. [pdf]

25. Mohammad Kamrul Islam, Pavan Balaji, P. Sadayappan and Dhabaleswar K. Panda. *QoPS: A QoS based scheme for Parallel Job Scheduling (extended journal version).* IEEE Springer LNCS Journal Series, pp. 252–268, Vol. 2862, 2003. [pdf]

Refereed Conference Publications

26. Palden Lama, Yan Li, Ashwin M. Aji, Pavan Balaji, James S. Dinan, Shucai Xiao, Yunquan Zhang, Wu-chun Feng, Rajeev S. Thakur and Xiaobo Zhou. *pVOCL: Power-Aware Dynamic Placement and Migration in Virtualized GPU Environments.* International Conference on Distributed Computing Systems (ICDCS). July 8–11, 2013, Philadelphia, Pennsylvania.

27. Xin Zhao, Darius T. Buntinas, Judicael Zounmevo, James S. Dinan, David J. Goodell, Pavan Balaji, Rajeev S. Thakur, Ahmad Afsahi and William D. Gropp. *Towards Generalized, Asynchronous, and MPI-Interoperable Active Messages.* IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (CCGrid). May 13–16, 2013, Delft, Netherlands.

28. Jing Zhang, Heshan Lin, Pavan Balaji and Wu-chun Feng. *Optimizing Burrows-Wheeler Transform-Based Sequence Alignment on Multicore Architectures.* IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (CCGrid). May 13–16, 2013, Delft, Netherlands.

29. Jeffrey R. Hammond, James S. Dinan, Pavan Balaji, Ivo Kabadshow, Sreeram Potluri and Vinod Tipparaju. *OSPRI: An Optimized One-Sided Communication Runtime for Leadership-Class Machines.* International Conference on Partitioned Global Address Space Programming Models (PGAS). Oct. 10–12, 2012, Santa Barbara, California. [pdf] [slides]

30. John Jenkins, James S. Dinan, Pavan Balaji, Nagiza F. Samatova and Rajeev S. Thakur. *Enabling Fast, Noncontiguous GPU Data Movement in Hybrid MPI+GPU Environments.* IEEE International Conference on Cluster Computing (Cluster). Sep. 28–30, 2012, Beijing, China. [pdf] [slides]

31. Torsten Hoefler, James S. Dinan, Darius T. Buntinas, Pavan Balaji, Brian Barrett, Ronald Brightwell, William D. Gropp, Vivek Kale, Rajeev S. Thakur. *Leveraging MPI's One-Sided Communication Interface for Shared-Memory Programming.* The Euro MPI Users' Group Conference (EuroMPI). Sep. 23–26, 2012, Vienna, Austria. [pdf] [slides]

32. James S. Dinan, David J. Goodell, William D. Gropp, Rajeev S. Thakur, and Pavan Balaji. *Efficient Multithreaded Context ID Allocation in MPI.* The Euro MPI Users' Group Conference (EuroMPI). Sep. 23–26, 2012, Vienna, Austria. [pdf] [slides]

33. Feng Ji, Ashwin M. Aji, James S. Dinan, Darius T. Buntinas, Pavan Balaji, Rajeev S. Thakur, Wu-chun Feng and Xiaosong Ma. *DMA-Assisted, Intranode Communication in GPU Accelerated Systems.* IEEE International Conference on High Performance Computing and Communications (HPCC). June 25–27, 2012, Liverpool, UK. [pdf] [slides]

34. Ashwin M. Aji, James S. Dinan, Darius T. Buntinas, Pavan Balaji, Wu-chun Feng, Keith R. Bisset and Rajeev S. Thakur. *MPI-ACC: An Integrated and Extensible Approach to Data Movement in Accelerator-Based Systems.* IEEE International Conference on High Performance Computing and Communications (HPCC). June 25–27, 2012, Liverpool, UK. [pdf] [slides]

35. James S. Dinan, Pavan Balaji, Jeffrey R. Hammond, Sriram Krishnamoorthy and Vinod Tipparaju. *Supporting the Global Arrays PGAS Model Using MPI One-Sided Communication.* IEEE International Parallel and Distributed Processing Symposium (IPDPS). May 21–25, 2012, Shanghai, China. [pdf] [slides]

36. Shucai Xiao, Pavan Balaji, James S. Dinan, Qian Zhu, Rajeev S. Thakur, Susan Coghlan, Heshan Lin, Gaojin Wen, Jue Hong and Wu-chun Feng. *Transparent Accelerator Migration in a Virtualized GPU Environment.* IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (CCGrid). May 13–16, 2012, Ottawa, Canada. [pdf] [slides]

37. Shucai Xiao, Pavan Balaji, Qian Zhu, Rajeev S. Thakur, Susan Coghlan, Heshan Lin, Gaojin Wen, Jue Hong and Wu-chun Feng. *VOCL: An Optimized Environment for Transparent Virtualization of Graphics Processing Units.* International Conference on Innovative Parallel Computing (InPar). May 12–14, 2012, San Jose, California. [pdf] [slides]

38. Rui Wang, Erlin Yao, Pavan Balaji, Darius T. Buntinas, Mingyu Chen and Guangming Tan. *Building Algorithmically Nonstop Fault Tolerant MPI Programs.* IEEE International Conference on High Performance Computing (HiPC). Dec. 18–21, 2011, Bangalore, India. [pdf] [slides]

39. Gaojin Wen, Jue Hong, Cheng-Zhong Xu, Pavan Balaji, Shengzhong Feng and Pingchuang Jiang. *Energy-aware Hierarchy Scheduling of Applications in Large Scale Data Centers.* International Conference on Cloud and Service Computing (CSC). Dec. 12–14, 2011, Hong Kong, China. [pdf] [slides]

40. James S. Dinan, Sriram Krishnamoorthy, Pavan Balaji, Jeffrey R. Hammond, Manoj Krishnan, Vinod Tipparaju and Abhinav Vishnu. *Noncollective Communicator Creation in MPI.* The Euro MPI Users' Group Conference (EuroMPI); special session on Improving MPI User and Developer Interaction (IMUDI). Sep. 18–21, 2011, Santorini, Greece. [pdf] [slides]

41. Mohammad J. Rashti, Jonathan Green, Pavan Balaji, Ahmad Afsahi and William D. Gropp. *Multi-core and Network Aware MPI Topology Functions.* The Euro MPI Users' Group Conference (EuroMPI). Sep. 18–21, 2011, Santorini, Greece. [pdf] [slides]

42. Ryan E. Grant, Mohammad J. Rashti, Pavan Balaji and Ahmad Afsahi. *RDMA Capable iWARP over Datagrams.* IEEE International Parallel and Distributed Processing Symposium (IPDPS). May 16–20, 2011, Anchorage, Alaska. [pdf] [slides]

43. Mohammad J. Rashti, Ryan E. Grant, Pavan Balaji and Ahmad Afsahi. *iWARP Redefined: Scalable Connectionless Communication over High-Speed Ethernet.* IEEE International Conference on High Performance Computing (HiPC). Dec. 19–22, 2010, Goa, India. [pdf] [slides]

44. Abhinav Vishnu, Huub Van Dam, Wibe De Jong, Pavan Balaji and Shuaiwen Song. *Fault Tolerant Communication Runtime Support for Data Centric Programming Models.* IEEE International Conference on High Performance Computing (HiPC). Dec. 19–22, 2010, Goa, India. [pdf] [slides]

45. Yang Jiao, Heshan Lin, Pavan Balaji and Wu-chun Feng. *Power and Performance Characterization of Computational Kernels on the GPU.* IEEE/ACM International Conference on Green Computing and Communications (GreenCom). Dec. 18–20, 2010, Hangzhou, China. [pdf] [slides]

46. Abhinav Vishnu, Shuaiwen Song, Andres Marquez, Kevin Barker, Darren Kerbyson, Kirk W. Cameron, Pavan Balaji. *Designing Energy Efficient Communication Runtime Systems for Data Centric Programming Models.* IEEE/ACM International Conference on Green Computing and Communications (GreenCom). Dec. 18–20, 2010, Hangzhou, China. [pdf] [slides]

47. David J. Goodell, Pavan Balaji, Darius T. Buntinas, Gabor Dózsa, William D. Gropp, Sameer Kumar, Bronis R. de Supinski and Rajeev S. Thakur. *Minimizing MPI Resource Contention in Multithreaded Multicore Environments.* IEEE International Conference on Cluster Computing (Cluster). Sep. 20–24, 2010, Heraklion, Crete, Greece. [pdf] [slides]

48. Pavan Balaji, Darius T. Buntinas, David J. Goodell, William D. Gropp, Jayesh Krishna, Ewing L. (Rusty) Lusk and Rajeev S. Thakur. *PMI: A Scalable Parallel Process-Management Interface for Extreme-Scale Systems.* The Euro MPI Users' Group Conference (Euro MPI). Sep. 12–15, 2010, Stuttgart, Germany. [pdf] [slides]

49. Gabor Dózsa, Sameer Kumar, Pavan Balaji, Darius T. Buntinas, David J. Goodell, William D. Gropp, Joseph Ratterman and Rajeev S. Thakur. *Enabling Concurrent Multithreaded MPI Communication on Multicore Petascale Systems.* The Euro MPI Users' Group Conference (Euro MPI). Sep. 12–15, 2010, Stuttgart, Germany. [pdf] [slides]

50. Jayesh Krishna, Pavan Balaji, Ewing L. (Rusty) Lusk, Rajeev S. Thakur and Fab Tiller. *Implementing MPI on Windows: Comparison with Common Approaches on Unix.* The Euro MPI Users' Group Conference (Euro MPI). Sep. 12–15, 2010, Stuttgart, Germany. [pdf] [slides]

51. Ryan E. Grant, Pavan Balaji and Ahmad Afsahi. *A Study of Hardware Assisted IP over InfiniBand and its Impact on Enterprise Data Center Performance.* IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS). Mar. 28–30, 2010, White Plains, NY. [pdf] [slides]

52. James S. Dinan, Pavan Balaji, Ewing L. (Rusty) Lusk, P. Sadayappan and Rajeev S. Thakur. *Hybrid Parallel Programming with MPI and Unified Parallel C.* ACM International Conference on Computing Frontiers (CF). May 17–19, 2010, Bertinoro, Italy. [pdf] [slides]

53. Pavan Balaji, Harish Naik and Narayan Desai. *Understanding Network Saturation Behavior on Large-Scale Blue Gene/P Systems.* IEEE International Conference on Parallel and Distributed Systems (ICPADS). Dec. 8–10, 2009, Shenzhen, China. [pdf] [slides]

54. Ryan E. Grant, Ahmad Afsahi and Pavan Balaji. *An Evaluation of ConnectX Virtual Protocol Interconnect for Data Centers.* IEEE International Conference on Parallel and Distributed Systems (ICPADS). Dec. 8–10, 2009, Shenzhen, China. [pdf] [slides]

55. Ajeet Singh, Pavan Balaji and Wu-chun Feng. *GePSeA: A General-Purpose Software Acceleration Framework for Lightweight Task Offloading.* International Conference on Parallel Processing (ICPP). Sep. 22–25, 2009, Vienna, Austria. [pdf] [slides]

56. Narayan Desai, Darius T. Buntinas, Daniel Buettner, Pavan Balaji and Anthony K. Chan. *Improving Resource Availability by Relaxing Network Allocation Constraints on the Blue Gene/P.* International Conference on Parallel Processing (ICPP). Sep. 22–25, 2009, Vienna, Austria. [pdf] [slides]

57. Pavan Balaji, Darius T. Buntinas, David J. Goodell, William D. Gropp, Sameer Kumar, Ewing L. (Rusty) Lusk, Rajeev S. Thakur and Jesper Larsson Träff. *MPI on a Million Processors.* The Euro PVM/MPI Users' Group Conference (Euro PVM/MPI). **Outstanding Paper Award.** Sep. 7–10, 2009, Espoo, Finland. [pdf] [slides]

58. Gopalakrishnan Santhanaraman, Pavan Balaji, Karthik Gopalakrishnan, Rajeev S. Thakur, William D. Gropp and Dhabaleswar K. Panda. *Natively Supporting True One-sided Communication in MPI on Multi-core Systems with InfiniBand.* IEEE International Symposium on Cluster Computing and the Grid (CCGrid). May 18–21, 2009, Shanghai, China. [pdf] [slides]

59. Pavan Balaji, Sitha Bhagvat, Rajeev S. Thakur and Dhabaleswar K. Panda. *Sockets Direct Protocol for Hybrid Network Stacks: A Case Study with iWARP over 10G Ethernet.* International Conference on High Performance Computing (HiPC). Dec. 17–20, 2008, Bangalore, India. [pdf] [slides]

60. Anthony K. Chan, Pavan Balaji, William D. Gropp and Rajeev S. Thakur. *Communication Analysis of Parallel 3D FFT for Flat Cartesian Meshes on Large Blue Gene Systems.* International Conference on High Performance Computing (HiPC). Dec. 17–20, 2008, Bangalore, India. [pdf] [slides]

61. Mithlesh Kumar, Vineeta Chaube, Pavan Balaji, Wu-chun Feng and Hyun-Wook Jin. *Making a Case for Proactive Flow Control in Optical Circuit-Switched Networks.* International Conference on High Performance Computing (HiPC). Dec. 17–20, 2008, Bangalore, India. [pdf] [slides]

62. Heshan Lin, Pavan Balaji, Ruth Poole, Carlos Sosa, Xiaosong Ma and Wu-chun Feng. *Massively Parallel Genomic Sequence Search on the Blue Gene/P Architecture.* IEEE/ACM International Conference for High Performance Computing, Networking, Storage and Analysis (SC). Nov. 15–21, 2008, Austin, Texas. [pdf] [slides]

63. Thomas R. W. Scogland, Ganesh Narayanaswamy, Pavan Balaji and Wu-chun Feng. *Asymmetric Interactions in Symmetric Multi-core Systems: Analysis, Enhancements and Evaluation.* IEEE/ACM International Conference for High Performance Computing, Networking, Storage and Analysis (SC). Nov. 15–21, 2008, Austin, Texas. [pdf] [slides]

64. Narayan Desai, Pavan Balaji, P. Sadayappan and Mohammad Kamrul Islam. *Are Non-Blocking Networks Really Needed for High-End-Computing Workloads?* IEEE International Conference on Cluster Computing (Cluster). **Best Paper Award**. Sep. 29 – Oct. 1st, 2008, Tsukuba, Japan. [pdf] [slides]

65. Pavan Balaji, Anthony K. Chan, William D. Gropp, Rajeev S. Thakur and Ewing L. (Rusty) Lusk. *Non-Data-Communication Overheads in MPI: Analysis on Blue Gene/P.* The Euro PVM/MPI Users' Group Conference (Euro PVM/MPI). **Outstanding Paper Award.** Sep. 7–10, 2008, Dublin, Ireland. [pdf] [slides]

66. Pavan Balaji, Darius T. Buntinas, David J. Goodell, William D. Gropp and Rajeev S. Thakur. *Toward Efficient Support for Multithreaded MPI Communication.* The Euro PVM/MPI Users' Group Conference (Euro PVM/MPI). Sep. 7–10, 2008, Dublin, Ireland. [pdf] [slides]

67. Jesper Larsson Träff, Andreas Ripke, Christian Siebert, Pavan Balaji, Rajeev S. Thakur and William D. Gropp. *A Simple, Pipelined Algorithm for Large, Irregular All-gather Problems.* The Euro PVM/MPI Users' Group Conference (Euro PVM/MPI). Sep. 7–10, 2008, Dublin, Ireland. [pdf] [slides]

68. Ganesh Narayanaswamy, Pavan Balaji and Wu-chun Feng. *Impact of Network Sharing in Multi-core Architectures.* IEEE International Conference on Computer Communication and Networks (ICCCN). Aug. 3–7, 2008, St. Thomas, U.S. Virgin Islands. [pdf] [slides]

69. Pavan Balaji, Wu-chun Feng and Heshan Lin. *Semantics-based Distributed I/O with the ParaMEDIC Framework.* ACM/IEEE International Symposium on High Performance Distributed Computing (HPDC). Jun. 23–27, 2008, Boston, Massachusetts. [pdf] [slides]

70. Pavan Balaji, Wu-chun Feng, Heshan Lin, Jeremy Archuleta, Satoshi Matsuoka, Andrew Warren, João Carlos Setubal, Ewing L. (Rusty) Lusk, Rajeev S. Thakur, Ian Foster, Daniel S. Katz, Shantenu Jha, Kevin Shinpaugh, Susan Coghlan and Daniel A. Reed. *Distributed I/O with ParaMEDIC: Experiences with a Worldwide Supercomputer.* International Supercomputing Conference (ISC). **Outstanding Paper Award**. Jun. 17–20, 2008, Dresden, Germany. [pdf] [slides]

71. Pavan Balaji, Wu-chun Feng, Jeremy Archuleta, Heshan Lin, Rajkumar Kettimuthu, Rajeev S. Thakur and Xiaosong Ma. *Semantics-based Distributed I/O for mpiBLAST.* Short paper. ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming (PPoPP). Feb. 20–23, 2008, Salt Lake City, Utah. [pdf] [poster]

72. Pavan Balaji, Wu-chun Feng, Sitha Bhagvat, Dhabaleswar K. Panda, Rajeev S. Thakur and William D. Gropp. *Analyzing the Impact of Supporting Out-of-Order Communication on In-order Performance with iWARP.* IEEE/ACM International Conference for High Performance Computing, Networking, Storage and Analysis (SC). Nov. 10–16, 2007, Reno, Nevada. [pdf] [slides]

73. Pavan Balaji, Wu-chun Feng, Jeremy Archuleta and Heshan Lin. *ParaMEDIC: Parallel Metadata Environment for Distributed I/O and Computing.* IEEE/ACM International Conference for High Performance Computing, Networking, Storage and Analysis (SC). **Storage Challenge Award**. Nov. 10–16, 2007, Reno, Nevada. [pdf] [slides]

74. Pavan Balaji, Sitha Bhagvat, Dhabaleswar K. Panda, Rajeev S. Thakur and William D. Gropp. *Advanced Flow-control Mechanisms for the Sockets Direct Protocol over InfiniBand.* IEEE International Conference on Parallel Processing (ICPP). Sep. 10–14, 2007, Xi'an, China. [pdf] [slides]

75. Mohammad Kamrul Islam, Pavan Balaji, Gerald Sabin and P. Sadayappan. *Analyzing and Minimizing the Impact of Opportunity Cost in QoS-aware Job Scheduling.* IEEE International Conference on Parallel Processing (ICPP). Sep. 10–14, 2007, Xi'an, China. [pdf] [slides]

76. Ganesh Narayanaswamy, Pavan Balaji and Wu-chun Feng. *An Analysis of 10-Gigabit Ethernet Protocol Stacks in Multicore Environments.* IEEE International Symposium on High-Performance Interconnects (HotI). Aug. 22–24, 2007, Palo Alto, California. [pdf] [slides]

77. Pavan Balaji, Darius T. Buntinas, Satish Balay, Barry F. Smith, Rajeev S. Thakur and William D. Gropp. *Nonuniformly Communicating Noncontiguous Data: A Case Study with PETSc and MPI.* IEEE International Parallel and Distributed Processing Symposium (IPDPS). Mar. 26–30, 2007, Long Beach, California. [pdf] [slides]

78. Pavan Balaji, Wu-chun Feng, Qi Gao, Ranjit Noronha, Weikuan Yu and Dhabaleswar K. Panda. *Head-to-TOE Comparison for High Performance Sockets over Protocol Offload Engines.* IEEE International Conference on Cluster Computing (Cluster). Sep. 26–30, 2005, Boston, Massachusetts. [pdf] [slides]

79. Wu-chun Feng, Pavan Balaji, Christopher Baron, Laxmi N. Bhuyan and Dhabaleswar K. Panda. *Performance Characterization of a 10-Gigabit Ethernet TOE.* IEEE International Symposium on High Performance Interconnects (HotI). Aug. 17–19, 2005, Palo Alto, California. [pdf] [slides]

80. Sundeep Narravula, Pavan Balaji, Karthikeyan Vaidyanathan, Hyun-Wook Jin and Dhabaleswar K. Panda. *Architecture for Caching Responses with Multiple Dynamic Dependencies in Multi-Tier Data-Centers over InfiniBand.* IEEE/ACM International Symposium on Cluster Computing and the Grid (CCGrid). May 9–12, 2005, Cardiff, UK. [pdf] [slides]

81. Pavan Balaji, Karthikeyan Vaidyanathan, Sundeep Narravula, Hyun-Wook Jin and Dhabaleswar K. Panda. *On the Provision of Prioritization and Soft QoS in Dynamically Reconfigurable Shared Data-Centers over InfiniBand.* IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS). Mar. 20–22, 2005, Austin, Texas. [pdf] [slides]
82. Mohammad Kamrul Islam, Pavan Balaji, P. Sadayappan and Dhabaleswar K. Panda. *Towards Provision of Quality of Service Guarantees in Job Scheduling.* IEEE International Conference on Cluster Computing (Cluster). Sep. 20–23, 2004, San Diego, California. [pdf] [slides]
83. Pavan Balaji, Sundeep Narravula, Karthikeyan Vaidyanathan, Savitha Krishnamoorthy, Jiesheng Wu and Dhabaleswar K. Panda. *Sockets Direct Protocol over InfiniBand in Clusters: Is it Beneficial?* IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS). Mar. 10–12, 2004, Austin, Texas. [pdf] [slides]
84. Rohan Kurian, Pavan Balaji and P. Sadayappan. *Opportune Job Shredding: An Efficient Approach for Scheduling Parameter Sweep Applications.* Los Alamos Computer Science Institute (LACSI) Symposium. Oct. 12–14, 2003, Santa Fe, New Mexico. [pdf] [slides]
85. Pavan Balaji, Jiesheng Wu, Tahsin Kurc, Ümit V. Çatalyürek, Dhabaleswar K. Panda and Joel Saltz. *Impact of High Performance Sockets on Data Intensive Applications.* IEEE International Symposium on High Performance Distributed Computing (HPDC). Jun. 22–24, 2003, Seattle, Washington. [pdf] [slides]
86. Rinku K. Gupta, Pavan Balaji, Jarek Nieplocha and Dhabaleswar K. Panda. *Efficient Collective Operations using Remote Memory Operations on VIA-based Clusters.* IEEE International Parallel and Distributed Processing Symposium (IPDPS). Apr. 22–26, 2003, Nice, France. [pdf] [slides]
87. Pavan Balaji, Piyush Shivam, Peter Wyckoff and Dhabaleswar K. Panda. *High Performance User-level Sockets over Gigabit Ethernet.* IEEE International Conference on Cluster Computing (Cluster). Sep. 23–26, 2002, Chicago, Illinois. [pdf] [slides]

Refereed Workshop Publications

88. Ashwin M. Aji, Pavan Balaji, James S. Dinan, Wu-chun Feng and Rajeev S. Thakur. *Synchronization and Ordering Semantics in Hybrid MPI+GPU Programming.* Workshop on Accelerators and Hybrid Exascale Systems (AsHES); held in conjunction with the IEEE International Parallel and Distributed Processing Symposium (IPDPS). May 20th, 2013, Boston, Massachusetts.
89. Hajime Fujita, Pavan Balaji, James S. Dinan, Jeffrey R. Hammond, Kamil Iskra, Guoming Lu, Zachary Rubenstein, Robert Schreiber, Andrew Siegel, and Andrew A. Chien. *Enabling Partnered Error Recovery in a Global-View Programming Model.* Workshop on Silicon Errors in Logic - System Effects (SELSE). Mar. 26–27, 2013, Stanford, California.
90. Rinku K. Gupta, Kamil Iskra, Kazutomo Yoshii, Peter H. Beckman and Pavan Balaji. *Introspective Fault Tolerance for Exascale Systems.* U.S. Department of Energy Advanced Scientific Computing Research, OS and Runtime Technical Council Workshop. Oct. 4–5, 2012, Washington, DC. [pdf]
91. Feng Ji, James S. Dinan, Darius T. Buntinas, Pavan Balaji, Xiaosong Ma and Wu-chun Feng. *Optimizing GPU-to-GPU intra-node communication in MPI.* Workshop on Accelerators and Hybrid Exascale Systems (AsHES); held in conjunction with the IEEE International Parallel and Distributed Processing Symposium (IPDPS). May 25th, 2012, Shanghai, China. [pdf] [slides]
92. Jeffrey A. Stuart, Pavan Balaji, and John D. Owens. *Extending MPI to Accelerators.* Workshop on Architectures and Systems for Big Data (ASBD); held in conjunction with the International Conference on Parallel Architectures and Compilation Techniques (PACT). Oct. 10th, 2011, Galveston Island, Texas. [pdf] [slides]
93. Abhinav Vishnu, Manoj Krishnan and Pavan Balaji. *Dynamic Time-Variant Connection Management for PGAS Models on InfiniBand.* Workshop on Communication Architecture for Scalable Systems (CASS); held in conjunction with the IEEE International Parallel and Distributed Processing Symposium (IPDPS). May 16th, 2011, Anchorage, Alaska. [pdf] [slides]
94. Pavan Balaji, Sitha Bhagvat, Hyun-Wook Jin and Dhabaleswar K. Panda. *Asynchronous Zero-copy Communication for Synchronous Sockets in the Sockets Direct Protocol (SDP) over InfiniBand.* Workshop on Communication Architecture for Clusters (CAC); held in conjunction with the IEEE International Parallel and Distributed Processing Symposium (IPDPS). Apr. 25th, 2006, Rhodes Island, Greece. [pdf] [slides]

95. Venkatram Vishwanath, Pavan Balaji, Wu-chun Feng, Jason Leigh, Dhabaleswar K. Panda. *A Case for UDP Offload Engines in LambdaGrids.* Workshop on Protocols for Fast Long-Distance Networks (PFLDnet). Feb. 2-3, 2006, Nara, Japan. [pdf] [slides]

96. Pavan Balaji, Hyun-Wook Jin, Karthikeyan Vaidyanathan and Dhabaleswar K. Panda. *Supporting iWARP Compatibility and Features for Regular Network Adapters.* Workshop on Remote Direct Memory Access (RDMA): Applications, Implementations and Techniques (RAIT); held in conjunction with IEEE International conference on Cluster Computing (Cluster). Sep. 26th, 2005, Boston, Massachusetts. [pdf] [slides]

97. Hyun-Wook Jin, Sundeep Narravula, Gregory Brown, Karthikeyan Vaidyanathan, Pavan Balaji and Dhabaleswar K. Panda. *Performance Evaluation of RDMA over IP Networks: A Study with the Ammasso Gigabit Ethernet NIC.* Workshop on High Performance Interconnects for Distributed Computing (HPI-DC); held in conjunction with IEEE International Symposium on High Performance Distributed Computing (HPDC). Jul. 24th, 2005, Research Triangle Park, North Carolina. [pdf] [slides]

98. Karthikeyan Vaidyanathan, Pavan Balaji, Hyun-Wook Jin and Dhabaleswar K. Panda. *Workload driven analysis of File Systems in Shared Multi-Tier Data-Centers over InfiniBand.* Workshop on Computer Architecture Evaluation using Commercial Workloads (CAECW); held in conjunction with IEEE International Symposium on High Performance Computer Architecture (HPCA). Feb. 12th, 2005, San Francisco, California. [pdf] [slides]

99. Pavan Balaji, Hemal V. Shah and Dhabaleswar K. Panda. *Sockets vs. RDMA Interface over 10-Gigabit Networks: An In depth Analysis of the Memory Traffic Bottleneck.* Workshop on Remote Direct Memory Access (RDMA): Applications, Implementations and Technologies (RAIT); held in conjunction with IEEE International Conference on Cluster Computing (Cluster). Sep. 20th, 2004, San Diego, California. [pdf] [slides]

100. Pavan Balaji, Karthikeyan Vaidyanathan, Sundeep Narravula, Savitha Krishnamoorthy, Hyun-Wook Jin and Dhabaleswar K. Panda. *Exploiting Remote Memory Operations to Design Efficient Reconfiguration for Shared Data-Centers over InfiniBand.* Workshop on Remote Direct Memory Access (RDMA): Applications, Implementations and Technologies (RAIT); held in conjunction with IEEE International Conference on Cluster Computing (Cluster). Sep. 20th, 2004, San Diego, California. [pdf] [slides]

101. Sundeep Narravula, Pavan Balaji, Karthikeyan Vaidyanathan, Savitha Krishnamoorthy, Jiesheng Wu and Dhabaleswar K. Panda. *Supporting Strong Coherency for Active Caches in Multi-Tier Data-Centers over InfiniBand.* Workshop on System Area Networks (SAN); held in conjunction with IEEE International Symposium on High Performance Computer Architecture (HPCA). Feb. 14th, 2004, Madrid, Spain. [pdf] [slides]

102. Mohammad Kamrul Islam, Pavan Balaji, P. Sadayappan and Dhabaleswar K. Panda. *QoPS: A QoS based scheme for Parallel Job Scheduling.* Job Scheduling Strategies for Parallel Processing (JSSPP) workshop; held in conjunction with IEEE International Symposium on High Performance Distributed Computing (HPDC). Jun. 24th, 2003, Seattle, Washington. [pdf] [slides]

Refereed Poster Papers

103. Jintao Meng, Bingqiang Wang, Yanjie Wei, Shengzhong Feng, Jiefeng Cheng and Pavan Balaji. *SWAP-Assembler: A Scalable De Bruijn Graph Based Assembler for Massive Genome Data.* International Conference on Research in Computational Molecular Biology (RECOMB). Apr. 7–10, 2013, Beijing, China.

104. James S. Dinan, Pavan Balaji, Jeffrey R. Hammond, Sriram Krishnamoorthy, and Vinod Tipparaju. *High-Level, One-Sided Programming Models on MPI: A Case Study with Global Arrays and NWChem.* IEEE/ACM International Conference for High Performance Computing, Networking, Storage and Analysis (SC). Nov. 12–18, 2011, Seattle, Washington. [pdf] [poster]

105. Jeffrey R. Hammond, Sreeram Potluri, Zheng (Cynthia) Gu, Alex Dickson, James S. Dinan, Ivo Kabadshow, Pavan Balaji, and Vinod Tipparaju. *Fast One-Sided Communication on Supercomputers and Application to Three Scientific Codes.* IEEE/ACM International Conference for High Performance Computing, Networking, Storage and Analysis (SC). Nov. 12–18, 2011, Seattle, Washington. [poster]

Invited Papers

106. Rajeev S. Thakur, Pavan Balaji, Darius T. Buntinas, David J. Goodell, William D. Gropp, Torsten Hoefler, Sameer Kumar, Ewing L. (Rusty) Lusk and Jesper Larsson Träff. *MPI at Exascale.* Department of Energy SciDAC workshop. Jul. 11-15th, 2010, Chattanooga, Tennessee. [pdf] [slides]

107. Wu-chun Feng, Pavan Balaji and Ajeet Singh. *Network Interface Cards as First-Class Citizens.* Workshop on The Influence of I/O on Microprocessor Architecture (IOM); held in conjunction with the IEEE International Symposium on High Performance Computer Architecture (HPCA). Feb. 15th, 2009, Raleigh, North Carolina. [pdf] [slides]

108. Karthikeyan Vaidyanathan, Sundeep Narravula, Pavan Balaji and Dhabaleswar K. Panda. *Designing Efficient Systems Services and Primitives for Next-Generation Data-Centers.* Workshop on the National Science Foundation Next Generation Software (NSFNGS) Program; held in conjunction with the IEEE International Parallel and Distributed Processing Symposium (IPDPS). Mar. 26th, 2007, Long Beach, California. [pdf] [slides]

109. Pavan Balaji, Karthikeyan Vaidyanathan, Sundeep Narravula, Hyun-Wook Jin and Dhabaleswar K. Panda. *Designing Next Generation Data-centers with Advanced Communication Protcols and Systems Services.* Workshop on the National Science Foundation Next Generation Software (NSFNGS) Program; held in conjunction with the IEEE International Parallel and Distributed Processing Symposium (IPDPS). Apr. 25th, 2006, Rhodes Island, Greece. [pdf] [slides]

Technical Reports

110. Karthikeyan Vaidyanathan, Sitha Bhagvat, Pavan Balaji and Dhabaleswar K. Panda. *Understanding the Significance of Network Performance in End Applications: A Case Study with EtherFabric and InfiniBand.* Technical Report, OSU-CISRC-2/06-TR19, The Ohio State University. Feb, 2006. [pdf]

111. Karthikeyan Vaidyanathan, Pavan Balaji, Jiesheng Wu, Hyun-Wook Jin and Dhabaleswar K. Panda. *An Architectural Study of Cluster-based Multi-tier Data-Centers.* Technical Report, OSU-CISRC-5/04-TR25, The Ohio State University. May, 2004. [pdf]

112. Savitha Krishnamoorthy, Pavan Balaji, Karthikeyan Vaidyanathan, Hyun-Wook Jin and Dhabaleswar K. Panda. *Dynamic Reconfigurability Support for providing Soft Quality of Service Guarantees in Multi-Tier Data-Centers over InfiniBand.* Technical Report, OSU-CISRC-2/04-TR10, The Ohio State University. Feb, 2004. [pdf]

PRESENTATIONS

Invited Plenary Talks

1. *Dynamic Global Provisioning and Execution with Virtualized Graphics Processing Units.* Tongji University (TU), Shanghai, China. Feb. 27th, 2013.

2. *A Computer Architect's View to Extreme-scale Genome Mapping and Assembly.* Beijing Genome Institute (BGI), Shenzhen, China. Feb. 25th, 2013.

3. *Commodity-driven Exascale Computing: Passing Fad or a Promising Future?* **Keynote Talk**. IEEE International Workshop on Parallel and Distributed Scientific and Engineering Computing (PDSEC), held in conjunction with the IEEE International Parallel and Distributed Processing Symposium (IPDPS), Shanghai, China. May 25th, 2012.

4. *Graphics Processing Units as a Cloud System Service.* Shanghai Jiao Tong University (SJTU), Shanghai, China. May. 24th, 2012.

5. *Challenges in Utilizing Clouds for High-End Scientific Computing Applications.* **Keynote Talk**. IEEE/ACM International Workshop on Cloud Computing and Scientific Applications (CCSA), held in conjunction with the IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (CCGrid), Ottawa, Canada. May 13th, 2012.

6. *Is Exascale End-of-the-Line for Commodity Computing?* Florida State University (FSU), Tallahassee, Florida. Jan. 27th, 2012.

7. *Fine-grained Resource Virtualization in Cloud Computing Systems.* Shenzhen Institute of Advanced Technologies, Chinese Academy of Sciences (SIAT), Shenzhen, China. Jan. 4th, 2012.

8. *Towards Virtualized Environments for Using Graphics Processing Units as a Cloud System Service.* Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences (SIAT), Shenzhen, China. Sep. 8th, 2011.

9. *Are Graphics Processing Units Viable as Cloud Services?* Tsinghua University, Beijing, China. Aug. 23rd, 2011.

10. *Fault Resilient Computing with MPI.* Institute of Computing Technologies, Chinese Academy of Sciences (ICT-CAS), Beijing, China. Aug. 23rd, 2011.

11. *Transparent Virtualization of Graphics Processing Units.* Institute of Software, Chinese Academy of Sciences (ISCAS), Beijing, China. Aug. 22nd, 2011.
12. *Is Exascale the Last Frontier for Commodity Computing?* **Distinguished Speaker Seminar**. Queen's University, Kingston, Canada. Mar. 17th, 2011.
13. *Trends in One-sided Communication Models.* Institute of Software, Chinese Academy of Sciences (CAS), Beijing, China. Jan. 10th, 2011.
14. *Towards Efficient Data and Computational Task Management on Distributed Cloud Computing Systems.* Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences (SIAT), Shenzhen, China. Jan. 6th, 2011.
15. *Will Existing Programming Models Evolve for Exascale Systems or Die?* Center for Development of Advanced Computing (C-DAC), Pune, India. Dec. 23rd, 2010.
16. *Is Hybrid Programming the Next Step in the Evolution of HPC?* Institute of Computing Technology, Chinese Academy of Sciences (ICT-CAS), Beijing, China. Dec. 3rd, 2010.
17. *Is MPI Relevant at Exascale?* Institute of Software, Chinese Academy of Sciences (ISCAS), Beijing, China. Nov. 29th, 2010.
18. *Is Hybrid Programming a Bad Idea Whose Time Has Come?* Pacific Northwest National Laboratory, Richmond, Washington. Nov. 23rd, 2009.
19. *The Race to Exascale: Communication Management for Massively Parallel Hierarchical Systems.* State University of New York, Binghamton, New York. Aug. 24th, 2009.
20. *Message Passing for a Million Processes.* Ohio State University (OSU), Columbus, Ohio. May 15th, 2009.
21. *And You Thought Threads Could Work in Parallel?* University of New Mexico (UNM), Albuquerque, New Mexico. Oct. 13th, 2008.
22. *Interfacing Multicores and High-speed Networks Towards Large-scale Computing Systems.* Virginia Tech (VT), Blacksburg, Virginia. Dec. 11th, 2007.
23. *Designing High-end Computing Systems with InfiniBand.* Illinois Institute of Technology (IIT), Chicago, Illinois. Jun. 21st, 2007.
24. *Accelerating Ethernet: Challenges and Pitfalls.* Aprius Inc., Sunnyvale, California. Mar. 28th, 2007.
25. *High Performance Messaging over High-speed Networks.* University of Chicago (over Access Grid), Argonne, Illinois. Nov. 2nd, 2006.
26. *SDP and Extended Sockets: A TOE and iWARP Perspective.* NetEffect Inc., Austin, Texas. Jun. 19th, 2006.
27. *TCP and iWARP Offload Engines: Challenges and Pitfalls.* NetEffect Inc., Austin, Texas. Jun. 19th, 2006.
28. *Designing High-performance Communication Support for Sockets-based Applications.* Hewlett-Packard (HP), Palo Alto, California. May 23rd, 2006.
29. *Enhancing the Performance and Compatibility of Sockets over High-Speed Networks.* QLogic Corporation, Mountain View, California. May 5th, 2006.
30. *Designing High-performance Communication Support for Sockets based Applications over System-area and Wide-area Networks.* D.E.Shaw, New York, New York. Apr. 11th, 2006.
31. *Designing High-performance Communication Support for Sockets based Applications over System-area and Wide-area Networks.* Virginia Tech (VT), Blacksburg, Virginia. Apr. 5th, 2006.
32. *Designing High Performance Communication Support for Sockets-based Applications over System-area and Wide-area Networks.* Argonne National Laboratory (ANL), Argonne, Illinois. Mar. 24th, 2006.

Invited Tutorials

33. *Advanced Parallel Programming with MPI-1, MPI-2 and MPI-3.* Half-day tutorial, jointly with Torsten Hoefler (ETH, Zurich). ACM Symposium on Principles and Practice of Parallel Programming (PPoPP), Shenzhen, China. Feb 24th, 2013.

34. *MPI for Dummies.* Half-day tutorial, jointly with Torsten Hoefler (ETH, Zurich). ACM Symposium on Principles and Practice of Parallel Programming (PPoPP), Shenzhen, China. Feb 24th, 2013.

35. *Advanced Parallel Programming with MPI.* Half-day tutorial. Center for Scalable Application Development Software (CScADS) workshop on Leadership Computing Platforms, Extreme-scale Applications, and Performance Strategies, Snowbird, Utah. July 24th, 2012.

36. *Hands-On Introduction to Parallel Programming with MPI.* Full-day tutorial. Shenzhen Institute of Advanced Technology (SIAT), Shenzhen, China. Sep. 9th, 2011.

37. *InfiniBand and High-Speed Ethernet Architectures for Scientific and Enterprise Computing: Opportunities and Challenges.* Half-day tutorial, jointly with Dhabaleswar K. Panda (Ohio State University) and Sayantan Sur (Ohio State University). IEEE International Symposium on High Performance Computer Architecture (HPCA), San Antonio, Texas. Feb. 12th, 2011.

38. *Introduction to Parallel Programming with MPI.* Short course. University of Tennessee Space Institute (UTSI), Tullahoma, Tennessee. Feb. 10th, 2011.

39. *Designing High-End Computing Systems with InfiniBand and High-speed Ethernet.* Half-day tutorial, jointly with Dhabaleswar K. Panda (Ohio State University) and Sayantan Sur (Ohio State University). IEEE/ACM International Conference for High Performance Computing, Networking, Storage and Analysis (SC), New Orleans, Louisiana. Nov. 14th, 2010.

40. *InfiniBand and 10-Gigabit Ethernet for Dummies.* Half-day tutorial, jointly with Dhabaleswar K. Panda (Ohio State University) and Sayantan Sur (Ohio State University). IEEE/ACM International Conference for High Performance Computing, Networking, Storage and Analysis (SC), New Orleans, Louisiana. Nov. 14th, 2010.

41. *Introduction to Parallel Programming with MPI.* Two-hour short course. University of Wisconsin at Milwaukee (UWM), Milwaukee, Wisconsin. Nov. 10th, 2010.

42. *Advanced Parallel Programming with MPI.* Two-hour short course. Community Surface Dynamic Modeling System Meeting (CSDMS), San Antonio, Texas. Oct. 17th, 2010.

43. *Introduction to Parallel Programming with MPI.* Two-hour short course. Community Surface Dynamic Modeling System Meeting (CSDMS), San Antonio, Texas. Oct. 16th, 2010.

44. *Designing High-End Computing Systems and Programming Models with InfiniBand and High-speed Ethernet.* Half-day tutorial, jointly with Dhabaleswar K. Panda (Ohio State University) and Sayantan Sur (Ohio State University). International Conference on Partitioned Global Address Space Models (PGAS), New York, New York. Oct. 15th, 2010.

45. *Designing High-End Computing Systems with InfiniBand and High-speed Ethernet.* Half-day tutorial, jointly with Dhabaleswar K. Panda (Ohio State University). IEEE International Conference on Cluster Computing (Cluster), Crete, Greece. Sep. 20th, 2010.

46. *Designing High-End Computing Systems with InfiniBand and High-speed Ethernet.* Half-day tutorial, jointly with Dhabaleswar K. Panda (Ohio State University) and Sayantan Sur (Ohio State University). IEEE International Symposium on High Performance Interconnects (HotI), Mountain View, California. Aug. 20th, 2010.

47. *Designing High-End Computing Systems with InfiniBand and 10-Gigabit Ethernet.* Half-day tutorial, jointly with Dhabaleswar K. Panda (Ohio State University) and Sayantan Sur (Ohio State University). ACM/SIGARCH International Conference on Supercomputing (ICS), Tsukuba, Japan. June 1st, 2010.

48. *Designing High-End Computing Systems with InfiniBand and 10-Gigabit Ethernet.* Half-day tutorial, jointly with Dhabaleswar K. Panda (Ohio State University). International Supercomputing Conference (ISC), Hamburg, Germany. May. 30th, 2010.

49. *InfiniBand and Ethernet Architectures for Scientific and Enterprise Computing: Opportunities and Challenges.* Half-day tutorial, jointly with Dhabaleswar K. Panda (Ohio State University). IEEE International Symposium on High-Performance Computer Architecture (HPCA), Bangalore, India. Jan. 9th, 2010.

50. *Designing High-End Computing Systems with InfiniBand and 10-Gigabit Ethernet.* Half-day tutorial, jointly with Dhabaleswar K. Panda (Ohio State University) and Matthew Koop (Ohio State University). IEEE/ACM International

Conference for High Performance Computing, Networking, Storage and Analysis (SC), Portland, Oregon. Nov. 15th, 2009.

51. *InfiniBand and 10-Gigabit Ethernet for Dummies.* Half-day tutorial, jointly with Dhabaleswar K. Panda (Ohio State University) and Matthew Koop (Ohio State University). IEEE/ACM International Conference for High Performance Computing, Networking, Storage and Analysis (SC), Portland, Oregon. Nov. 15th, 2009.

52. *Designing High-End Computing Systems with InfiniBand and 10-Gigabit Ethernet.* Half-day tutorial, jointly with Dhabaleswar K. Panda (Ohio State University) and Matthew Koop (Ohio State University). IEEE International Conference on Cluster Computing (Cluster), New Orleans, Louisiana. Sep. 4th, 2009.

53. *Designing High-End Computing Systems with InfiniBand and 10-Gigabit Ethernet.* Half-day tutorial, jointly with Dhabaleswar K. Panda (Ohio State University) and Matthew Koop (Ohio State University). IEEE International Conference on High Performance Interconnects (HotI), New York, New York. Aug. 25th, 2009.

54. *InfiniBand and 10-Gigabit Ethernet for Dummies.* Half-day tutorial, jointly with Dhabaleswar K. Panda (Ohio State University) and Matthew Koop (Ohio State University). IEEE International Conference on High Performance Interconnects (HotI), New York, New York. Aug. 25th, 2009.

55. *InfiniBand and 10-Gigabit Ethernet Architectures for Emerging HPC Clusters and Enterprise Datacenters.* Half-day tutorial, jointly with Dhabaleswar K. Panda (Ohio State University). IEEE International Symposium on High Performance Computer Architecture (HPCA), Raleigh, North Carolina. Feb. 14th, 2009.

56. *InfiniBand and 10-Gigabit Ethernet for Dummies.* Half-day tutorial, jointly with Dhabaleswar K. Panda (Ohio State University) and Matthew Koop (Ohio State University). IEEE/ACM International Conference for High Performance Computing, Networking, Storage and Analysis (SC), Austin, Texas. Nov. 16th, 2008.

57. *Designing High-End Computing Systems with InfiniBand and 10-Gigabit Ethernet.* Half-day tutorial, jointly with Dhabaleswar K. Panda (Ohio State University) and Matthew Koop (Ohio State University). IEEE/ACM International Conference for High Performance Computing, Networking, Storage and Analysis (SC), Austin, Texas. Nov. 16th, 2008.

58. *Designing HPC Clusters and Enterprise Datacenters: The InfiniBand and 10GE Way.* Half-day tutorial, jointly with Dhabaleswar K. Panda (Ohio State University). IEEE Symposium on High-Performance Interconnects (HotI), Palo Alto, California. Aug. 26th, 2008.

59. *High-Speed Network Architectures for Clusters: Designs and Trends.* Half-day tutorial, jointly with Dhabaleswar K. Panda (Ohio State University). IEEE International Symposium on Computer Architecture (ISCA), Beijing, China. Jun. 22nd, 2008.

60. *Message Passing for Dummies: Introduction to MPI.* Student Lecture Series, Argonne National Laboratory, Argonne, Illinois. Jun 9th, 2008.

61. *High-Speed Network Architectures for Clusters: Designs and Trends.* Half-day tutorial, jointly with Dhabaleswar K. Panda (Ohio State University). International Symposium on High-Performance Computer Architecture (HPCA), Salt Lake City, Utah. Feb. 16th, 2008.

62. *Designing High-End Computing Systems with InfiniBand and iWARP Standards.* Full-day tutorial, jointly with Dhabaleswar K. Panda (Ohio State University) and Sayantan Sur (Ohio State University). IEEE/ACM International Conference for High Performance Computing, Networking, Storage and Analysis (SC), Reno, Nevada. Nov. 10th, 2007.

63. *Designing High-End Computing Systems with InfiniBand and 10-Gigabit Ethernet.* Half-day tutorial, jointly with Dhabaleswar K. Panda (Ohio State University). IEEE International Conference on Cluster Computing (Cluster), Austin, Texas. Sep. 17th, 2007.

64. *Designing Clusters and Distributed Grid Computing Systems with InfiniBand and iWARP.* Half-day tutorial, jointly with Dhabaleswar K. Panda (Ohio State University). IEEE International Symposium on Cluster Computing and the Grid (CCGrid), Rio de Janeiro, Brazil. May 14th, 2007.

65. *State of InfiniBand in Designing HPC Clusters, Storage/File Systems, and Datacenters.* Full-day tutorial, jointly with Dhabaleswar K. Panda (Ohio State University) and Sayantan Sur (Ohio State University). IEEE/ACM International Conference for High Performance Computing, Networking, Storage and Analysis (SC), Seattle, Washington. Nov. 13th, 2005.

Invited Panel Presentations

66. *MPICH: 3.0 and Beyond.* MPICH Birds-of-a-Feather Panel. IEEE/ACM International Conference for High Performance Computing, Networking, Storage and Analysis (SC), Austin, Texas. Nov. 13th, 2012.
67. *Cloudy with a Chance of Scientific Discovery*. The Future of Cloud Computing Panel. IEEE/ACM International Conference on Utility and Cloud Computing (UCC), Chicago, Illinois. Nov. 7th, 2012.
68. *On-Chip Heterogeneity: The Last Man Standing*. Battle of the Accelerator Stars Panel. International Workshop on Parallel Programming Models and Systems Software for High-End Computing (P2S2), Pittsburgh, Pennsylvania. Sep. 10th, 2012.
69. *GPUs and Heterogeneous Accelerators: Programmability, Productivity, and Other Nightmares*. Frontiers of Computational Science and Engineering Panel. IEEE International Conference on Computational Science and Engineering (CSE), Dalian, China. Aug. 24th, 2011.
70. *Working Session Report on Resilience and Fault Tolerance.* ASCR Exascale Kickoff Meeting, San Diego, California. Mar. 11th, 2011.
71. *Crosscutting Topic Definitions Working Session Report.* ASCR Exascale Kickoff Meeting, San Diego, California. Mar. 11th, 2011.
72. *The Era of Hybrid Programming*. Challenges and Opportunities of HPC-based Distributed Systems Panel. IEEE International Conference on Parallel and Distributed Systems (ICPADS), Shanghai, China. Dec. 10th, 2010.
73. *MPICH2 on DCMF.* Deep Computing Messaging Framework Birds-of-a-Feather Panel. IEEE/ACM International Conference for High Performance Computing, Networking, Storage and Analysis (SC), Austin, Texas. Nov. 18th, 2008.

Conference and Workshop Presentations

74. *Transparent Accelerator Migration in a Virtualized GPU Environment.* IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (CCGrid). May 13th, 2012, Ottawa, Canada.
75. *Building Algorithmically Nonstop Fault Tolerant MPI Programs.* IEEE International Conference on High Performance Computing (HiPC), Bangalore, India. Dec. 20th, 2011.
76. *Mapping Communication Layouts to Network Hardware Characteristics on Massive-Scale Blue Gene Systems.* International Supercomputing Conference (ISC), Hamburg, Germany. Jun. 22nd, 2011.
77. *Understanding Network Saturation Behavior on Large-Scale Blue Gene/P Systems.* International Conference on Parallel and Distributed Systems (ICPADS), Shenzhen, China. Dec. 11th, 2009.
78. *An Evaluation of ConnectX Virtual Protocol Interconnect for Data Centers.* International Conference on Parallel and Distributed Systems (ICPADS), Shenzhen, China. Dec. 9th, 2009.
79. *GePSeA: A General-Purpose Software Acceleration Framework For Lightweight Task Offloading.* International Conference on Parallel Processing (ICPP), Vienna, Austria. Sep. 24th, 2009.
80. *Toward Message Passing for a Million Processes: Characterizing MPI on a Massive Scale Blue Gene/P.* International Supercomputing Conference (ISC), Hamburg, Germany. Jun. 23rd, 2009.
81. *ProOnE: A General Purpose Protocol Onload Engine for Multi- and Many-Core Architectures.* International Supercomputing Conference (ISC), Hamburg, Germany. June 23rd, 2009.
82. *Natively Supporting True One-sided Communication in MPI on Multi-core Systems with InfiniBand.* IEEE International Symposium on Cluster Computing and the Grid (CCGrid), Shanghai, China. May 21st, 2009.
83. *Making a Case for Proactive Flow Control in Optical Circuit-Switched Networks.* IEEE/ACM International Conference on High Performance Computing (HiPC), Bangalore, India. Dec. 20th, 2008.
84. *Sockets Direct Protocol for Hybrid Network Stacks: A Case Study with iWARP over 10G Ethernet.* IEEE/ACM International Conference on High Performance Computing (HiPC), Bangalore, India. Dec. 20th, 2008.
85. *Communication Analysis of Parallel 3D FFT for Flat Cartesian Meshes on Large Blue Gene Systems.* IEEE/ACM International Conference on High Performance Computing (HiPC), Bangalore, India. Dec. 19th, 2008.

86. *Non-Data-Communication Overheads in MPI: Analysis on Blue Gene/P.* The Euro PVM/MPI Users' Group Conference (Euro PVM/MPI), Dublin, Ireland. Sep. 8th, 2008.
87. *Impact of Network Sharing in Multi-core Architectures.* IEEE International Conference on Computer Communication and Networks (ICCCN), St. Thomas, U.S. Virgin Islands. Aug. 4th, 2008.
88. *Semantics-based Distributed I/O with the ParaMEDIC Framework.* ACM/IEEE International Symposium on High Performance Distributed Computing (HPDC), Boston, Massachusetts. Jun. 27th, 2008.
89. *Distributed I/O with ParaMEDIC: Experiences with a Worldwide Supercomputer.* International Supercomputing Conference (ISC), Dresden, Germany. Jun. 17th, 2008.
90. *Analyzing the Impact of Supporting Out-of-Order Communication on In-order Performance with iWARP.* IEEE/ACM International Conference for High Performance Computing, Networking, Storage and Analysis (SC), Reno, Nevada. Nov. 14th, 2007.
91. *Advanced Flow-control Mechanisms for the Sockets Direct Protocol over InfiniBand.* IEEE International Conference on Parallel Processing (ICPP), Xi'an, China. Sep. 13th, 2007.
92. *Analyzing and Minimizing the Impact of Opportunity Cost in QoS-aware Job Scheduling.* IEEE International Conference on Parallel Processing (ICPP), Xi'an, China. Sep. 12th, 2007.
93. *An Analysis of 10-Gigabit Ethernet Protocol Stacks in Multicore Environments.* IEEE International Symposium on High-Performance Interconnects (HotI), Palo Alto, California. Aug. 23rd, 2007.
94. *Nonuniformly Communicating Noncontiguous Data: A Case Study with PETSc and MPI.* IEEE International Parallel and Distributed Processing Symposium (IPDPS), Long Beach, California. Mar. 27th, 2007.
95. *Asynchronous Zero-copy Communication for Synchronous Sockets in the Sockets Direct Protocol (SDP) over InfiniBand.* Workshop on Communication Architecture for Clusters (CAC); held in conjunction with the IEEE International Parallel and Distributed Processing Symposium (IPDPS), Rhodes Island, Greece. Apr. 25th, 2006.
96. *Head-to-TOE Comparison for High Performance Sockets over Protocol Offload Engines.* IEEE International Conference on Cluster Computing (Cluster), Boston, Massachusetts. Sep. 29th, 2005.
97. *Supporting RDMA Capable Network Compatibility and Features for Regular Network Adapters.* Workshop on Remote Direct Memory Access (RDMA): Applications, Implementations and Techniques (RAIT); held in conjunction with the IEEE International conference on Cluster Computing (Cluster), Boston, Massachusetts. Sep. 26th, 2005.
98. *Performance Characterization of a 10-Gigabit Ethernet TOE.* IEEE International Symposium on High Performance Interconnects (HotI), Palo Alto, California. Aug. 18th, 2005.
99. *Sockets vs. RDMA Interface over 10-Gigabit Networks: An In depth Analysis of the Memory Traffic Bottleneck.* Workshop on Remote Direct Memory Access (RDMA): Applications, Implementations and Technologies (RAIT); held in conjunction with the IEEE International Conference on Cluster Computing (Cluster), San Diego, California. Sep. 20th, 2004.
100. *Exploiting Remote Memory Operations to Design Efficient Reconfiguration for Shared Data-Centers over InfiniBand.* Workshop on Remote Direct Memory Access (RDMA): Applications, Implementations and Technologies (RAIT); held in conjunction with the IEEE International Conference on Cluster Computing (Cluster), San Diego, California. Sep. 20th, 2004.
101. *Towards Provision of Quality of Service Guarantees in Job Scheduling.* IEEE International Conference on Cluster Computing (Cluster), San Diego, California. Sep. 22nd, 2004.
102. *Sockets Direct Protocol over InfiniBand in Clusters: Is it Beneficial?* IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS), Austin, Texas. Mar. 10th, 2004.
103. *Impact of High Performance Sockets on Data Intensive Applications.* IEEE International Symposium on High Performance Distributed Computing (HPDC), Seattle, Washington. Jun. 22nd, 2003.
104. *Efficient Collective Operations using Remote Memory Operations on VIA-based Clusters.* IEEE International Parallel and Distributed Processing Symposium (IPDPS), Nice, France. Apr. 24th, 2003.
105. *High Performance User-level Sockets over Gigabit Ethernet.* IEEE International Conference on Cluster Computing (Cluster), Chicago, Illinois. Sep. 25th, 2002.

Key Demos and Projects Showcase

106. *Early Experiences with MPICH over the Intel KNC Architecture.* Intel Exhibition Booth, International Supercomputing Conference (ISC), Hamburg, Germany. June 18-20, 2012.

107. *ParaMEDIC: Parallel Metadata Environment for Distributed I/O and Computing.* Argonne National Laboratory Exhibition Booth, IEEE/ACM International Conference for High Performance Computing, Networking, Storage and Analysis (SC), Reno, Nevada. November 13-15, 2007.

108. *InfiniBand: Performance and Implications on Next Generation Applications.* Exhibition Demo at the 10th Annual Coalition for National Science Funding Science Exhibition and Reception, Capitol Hill, Washington DC. June 23rd, 2003.

Poster Presentations

109. *Exploring Efficient Data Movement Strategies For Exascale Systems with Deep Memory Hierarchies.* U.S. Department of Energy Exascale Research Conference (ERC), Arlington, Virginia. Oct. 1st, 2012.

Miscellaneous Presentations and Seminars

110. *MPI-ACC: A Unified Data Movement Infrastructure for Heterogeneous Memory Architectures.* INRIA-ANL-Illinois Petascale Computing Joint Lab workshop, Argonne, IL. Nov. 19th, 2012.

111. *Exploring Efficient Data Movement Strategies For Exascale Systems with Deep Memory Hierarchies.* U.S. Department of Energy Exascale Research Conference (ERC), Arlington, Virginia. Oct. 1st, 2012.

112. *Message Passing in Hierarchical and Heterogeneous Environments: MPI-3 and Beyond.* Workshop on Productive Programming Models for the Exascale (PPME), Portland, Oregon. August 15th, 2012.

113. *Early Experiences with MPICH over the Intel KNF Architecture.* Intel Extreme MIC Workshop, Santa Fe, New Mexico. Feb. 22nd, 2012.

114. *Evolutionary Support for Revolutionary Programming Models and Runtime Systems.* Department of Energy (DOE), Advanced Scientific Computing Research (ASCR) Exascale Programming Models Workshop, Marina del Rey, California. Jul. 28th, 2011.

115. *A Unified Runtime Infrastructure for Exascale Programming Models.* Department of Energy (DOE), Advanced Scientific Computing Advisory Committee (ASCAC) meeting, Argonne, Illinois. Nov. 9th, 2010.

116. *Software Infrastructure/Sustainability Specific to Accelerators.* National Science Foundation (NSF), Scientific Software Innovation Institute (S2I2) planning workshop, Arlington, Virginia. Oct. 13th, 2010.

PROFESSIONAL ACTIVITIES

Chairmanships and Editorships

1. ***General, Program, and Vice/Area/Track Chairmanships***

   (i) Track Co-chair (with Luis Veiga, Technical University of Lisbon, Portugal). *IEEE International Conference on Cloud Computing Technology and Science (CloudCom)*. Virtualization Track, 2013.

   (ii) Area Co-chair (with Taisuke -Arai- Boku, University of Tsukuba, Japan). *IEEE/ACM International Conference on High Performance Computing, Networking, Storage and Analysis (SC)*. Systems Software Track, 2013.

   (iii) Program Co-chair (with Abhinav Vishnu, Pacific Northwest National Laboratory, USA; Yong Chen, Texas Tech University, USA). *International Workshop on Parallel Programming Models and Systems Software for High-end Computing (P2S2)*, 2013. (held in conjunction with the International Conference on Parallel Processing (ICPP)).

   (iv) Track Co-chair (with Ada Gavrilovska, Georgia Institute of Technology, USA). *IEEE International Conference on Computer Communications and Networks (ICCCN)*, Grid and Cloud Computing Track, 2013.

   (v) Program Co-chair (with Justin Y. Shi, Temple University, USA). *International Symposium on Cloud Computing and Services for High Performance Computing Systems (InterCloud-HPC)*, 2013.

(vi) Program Co-chair (with Zhiyi Huang, University of Otago, New Zealand; Minyi Guo, Shanghai Jiaotong University, China). *International Workshop on Programming Models and Applications for Multicores and Manycores (PMAM)*, 2013. (held in conjunction with the ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming (PPoPP)).

(vii) Program Co-chair (with Justin Y. Shi, Temple University, USA). *International Workshop of Sustainable High Performance Cloud (SHPCloud)*, 2012. (held in conjunction with the IEEE/ACM International Conference on High Performance Computing, Network, Storage and Analysis (SC)).

(viii) Track Co-chair (with Samee Ullah Khan, North Dakota State University, USA). *IEEE International Conference on Cloud Computing Technology and Science (CloudCom)*. Virtualization Track, 2012.

(ix) General co-chair (with Peter Palensky, Austrian Institute of Technology, Austria; Albert Y. Zomaya, The University of Sydney, Australia; Cheng-Zhong Xu, Shenzhen Institute of Advanced Technologies, China). *International Conference on Frontiers of Information Technology (FIT)*, 2012.

(x) Vice-chair. *IEEE International Conference on Parallel and Distributed Systems (ICPADS)*. Parallel and Distributed Algorithms and Applications Track, 2012.

(xi) Vice-chair. *IEEE International Conference on Scalable Computing and Communications (ScalCom)*. Data Intensive Computing Track, 2012.

(xii) Program Co-chair (with Abhinav Vishnu, Pacific Northwest National Laboratory, USA; Yong Chen, Texas Tech University, USA). *International Workshop on Parallel Programming Models and Systems Software for High-end Computing (P2S2)*, 2012. (held in conjunction with the International Conference on Parallel Processing (ICPP)).

(xiii) Co-vice-chair (with Dhrubajyoti Goswami, Concordia University, Canada; Paul Lu, University of Alberta, Canada; Tarek Abdelrahman, University of Toronto, Canada). *International Conference on Future Information Technology (FutureTech)*, High Performance Computing Track, 2012.

(xiv) Track Co-chair (with Ronald Brightwell, Sandia National Laboratory, USA). *IEEE International Conference on Computer Communications and Networks (ICCCN)*, High Speed and Data Center Networks Track, 2012.

(xv) General Chair. *International Workshop on Accelerators and Heterogeneous Exascale Systems (AsHES)*, 2012. (held in conjunction with the IEEE International Parallel and Distributed Processing Symposium (IPDPS)).

(xvi) Program Co-chair (with Rajkumar Buyya, University of Melbourne, Australia). *IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (CCGrid)*, 2012.

(xvii) Program Co-chair (with Abhinav Vishnu, Pacific Northwest National Laboratory, USA; Yong Chen, Oak Ridge National Laboratory, USA). *International Workshop on Parallel Programming Models and Systems Software for High-end Computing (P2S2)*, 2011. (held in conjunction with the International Conference on Parallel Processing (ICPP)).

(xviii) Track Co-chair (with Guihai Chen, Nanjing University, China). *IEEE International Conference on Computer Communications and Networks (ICCCN)*, Network Architectures and P2P Protocols Track, 2011.

(xix) Program Co-chair (with Jiayuan Meng, Argonne National Laboratory, USA). *International Workshop on Characterizing Applications for Heterogeneous Exascale Systems (CACHES)*, 2011. (held in conjunction with the IEEE International Parallel and Distributed Processing Symposium (IPDPS)).

(xx) Vice-chair. *IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (CCGrid)*, Scheduling and Resource Management Track, 2011.

(xxi) Vice-chair. *International Conference on Parallel Processing (ICPP)*, Resource Management and Scheduling Track, 2010.

(xxii) Program Co-chair (with Abhinav Vishnu, Pacific Northwest National Laboratory, USA). *International Workshop on Parallel Programming Models and Systems Software for High-end Computing (P2S2)*, 2010. (held in conjunction with the International Conference on Parallel Processing (ICPP)).

(xxiii) Program Co-chair (with Ronald Brightwell, Sandia National Laboratory, USA; Cyriel Minkenberg, IBM Research, Switzerland). *IEEE International Symposium on High Performance Interconnects (HotI)*, 2010.

(xxiv) Track Co-chair (with Gilles Fedak, INRIA, France). *IEEE International Conference on Computer Communications and Networks (ICCCN)*, High-speed Distributed Systems and Grids Track, 2010.

(xxv) Program Co-chair (with Abhinav Vishnu, Pacific Northwest National Laboratory, USA). *International Workshop on Parallel Programming Models and Systems Software for High-end Computing (P2S2)*, 2009. (held in conjunction with the International Conference on Parallel Processing (ICPP)).

(xxvi) Program Co-chair (with Ada Gavrilovska, Georgia Institute of Technology, USA). *International Workshop on High Performance Interconnects for Distributed Computing (HPI-DC)*, 2009. (held in conjunction with the IEEE International Conference on Cluster Computing (Cluster)).

(xxvii) Track Co-chair (with Li Xiao, Michigan State University, USA). *IEEE International Conference on Computer Communications and Networks (ICCCN)*, Pervasive Computing and Grid Networking Track, 2009.

(xxviii) Program Co-chair (with Sayantan Sur, IBM Research, USA). *International Workshop on Parallel Programming Models and Systems Software for High-end Computing (P2S2)*, 2008. (held in conjunction with the International Conference on Parallel Processing (ICPP)).

2. ***Journal Editorships***

(i) Associate Editor. *IEEE Transactions on Cloud Computing.* Term: 2013–2014.

(ii) Guest Co-editor (with Abhinav Vishnu, Pacific Northwest National Laboratory, USA; Yong Chen, Texas Tech University, USA). *Programming Models and Systems Software.* Special Issue of the International Journal of Supercomputing (JoS) for the best papers from the *6th International Workshop on Parallel Programming Models and Systems Software for High-End Computing (P2S2)*. (to be published in 2014).

(iii) Guest Co-editor (with Zhiyi Huang, University of Oswego, New Zealand). *Programming Models and Applications for Multicores and Manycores.* Special Issue of the International Parallel Computing (ParCo) journal for the best papers from the *5th International Workshop on Programming Models and Applications for Multicores and Manycores (PMAM)*. (to be published in 2013).

(iv) Guest Co-editor (with Abhinav Vishnu, Pacific Northwest National Laboratory, USA; Yong Chen, Texas Tech University, USA). *Parallel Programming Models and Systems Software.* Special Issue of the International Parallel Computing (ParCo) journal for the best papers from the *5th International Workshop on Parallel Programming Models and Systems Software for High-End Computing (P2S2)*. (to be published in 2013).

(v) Guest Co-editor (with Satoshi Matsuoka, Tokyo Institute of Technology, Japan). *Applications for the Heterogeneous Computing Era.* Special Issue of the International Journal of High Performance Computing Applications (IJHPCA) for the best papers from the *2nd International Workshop on Accelerators and Hybrid Exascale Systems (AsHES)*. (to be published in 2013).

(vi) Guest Co-editor (with Rajkumar Buyya, University of Melbourne, Australia). *Cluster, Cloud and Grid Computing.* Special Issue of the International Journal of Future Generation Computer Systems (FGCS) for the best papers from the *12th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (CCGrid)*. (to be published in 2013).

(vii) Guest Co-editor (with Abhinav Vishnu, Pacific Northwest National Laboratory, USA; Yong Chen, Texas Tech University, USA). *Programming Models and Systems Software.* Special Issue of the International Journal of Supercomputing (JoS) for the best papers from the *4th International Workshop on Parallel Programming Models and Systems Software for High-End Computing (P2S2)*. (to be published in 2012).

(viii) Guest Co-editor (with Jiayuan Meng, Argonne National Laboratory, USA). *Applications for the Heterogeneous Computing Era.* Special Issue of the International Journal of High Performance Computing Applications (IJHPCA) for the best papers from the *1st International Workshop on Characterizing Applications for Heterogeneous Exascale Systems (CACHES)*. (to be published in 2012).

(ix) Guest Co-editor (with Abhinav Vishnu, Pacific Northwest National Laboratory, USA). *Programming Models and Systems Software Support for High-End Computing Applications.* Special Issue of the International Journal of High Performance Computing Applications (IJHPCA) for the best papers from the *3rd International Workshop on Parallel Programming Models and Systems Software for High-End Computing (P2S2)*. Volume 25, No. 2, May, 2011.

(x) Guest Co-editor (with Abhinav Vishnu, Pacific Northwest National Laboratory, USA). *Programming Models and Systems Software Support for High-End Computing Applications.* Special Issue of the International Journal of High Performance Computing Applications (IJHPCA) for the best papers from the *2nd International Workshop on Parallel Programming Models and Systems Software for High-End Computing (P2S2)*, Volume 24, No. 3, Jul, 2010.

(xi) Guest Co-editor (with Wu-chun Feng, Virginia Tech, USA). *Tools and Environments for Multicore and Many-core Architectures.* Special Issue of IEEE Computer, Dec, 2009.

3. ***Other Chairmanships***

   (i) Workshops Co-chair (with Chiranjib Sur, IBM, India; Yogesh Simmhan, University of Southern California, Los Angeles, USA). *IEEE International Symposium on High Performance Computing (HiPC)*, 2013.

   (ii) Workshops Co-chair (with Anne Benoit, ENS Lyon, France). *International Conference on Parallel Processing (ICPP)*, 2013.

   (iii) Tutorials Chair. *International Supercomputing Conference (ISC)*, 2013.

   (iv) Submissions and Proceedings Chair. *IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (CCGrid)*, 2013.

   (v) Workshops Co-chair (with Manimaran Govindarasu, Iowa State University, USA; Chiranjib Sur, IBM, India). *IEEE International Symposium on High Performance Computing (HiPC)*, 2012.

   (vi) Workshops Co-chair (with Taisuke -Arai- Boku, University of Tsukuba, Japan). *IEEE/ACM International Conference on High Performance Computing, Networking, Storage and Analysis (SC)*, 2012.

   (vii) Local Arrangements Chair. *IEEE/ACM International Conference on Utility and Cloud Computing (UCC)*, 2012.

   (viii) Workshops Co-chair (with Heshan Lin, Virginia Tech, USA). *International Conference on Parallel Processing (ICPP)*, 2012.

   (ix) Posters Co-chair (with Wu-chun Feng, Virginia Tech, USA). *International Conference on Parallel Processing (ICPP)*, 2012.

   (x) Organizing Co-chair (with Rick Stevens, Argonne National Laboratory, USA; Wu-chun Feng, Virginia Tech, USA; Fangfang Xia, Argonne National Laboratory, USA; Shane Canon, Lawrence Berkeley National Laboratory, USA). *Institute of Computing in Science (ICiS) Workshop to Develop Next Generation Sequence Analysis Libraries*, 2012.

   (xi) Mini-symposium Chair. Session on *HPC System Interconnects* at the *International Supercomputing Conference (ISC)*, 2012.

   (xii) Tutorials Chair. *International Supercomputing Conference (ISC)*, 2012.

   (xiii) Organizing Co-chair (with Yunquan Zhang, Institute of Software, Chinese Academy of Sciences, China). *First Workshop of the MCS-ISCAS Joint Lab on Parallel Processing and Computing Techniques*, May 2012.

   (xiv) Organizing Co-chair (with Shantenu Jha, Rutgers University, USA). *IEEE TCSC Scalable Computing (SCALE) Challenge*, 2012.

   (xv) Workshops Co-chair (with Manimaran Govindarasu, Iowa State University, USA). *IEEE International Symposium on High Performance Computing (HiPC)*, 2011.

   (xvi) Posters and Research Demos Co-chair (with Rajiv Ranjan, University of New South Wales, Australia). *IEEE International Conference on Utility and Cloud Computing (UCC)*, 2011.

   (xvii) Tutorials Chair. *International Supercomputing Conference (ISC)*, 2011.

   (xviii) Tutorials Co-chair (with Sushil K. Prasad, Georgia State University, USA). *IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (CCGrid)*, 2011.

   (xix) Poster Awards Chair. *IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (CCGrid)*, Scheduling and Resource Management Track, 2011.

   (xx) Research Demo Co-chair (with A. B. M. Russel, VeRSI, Australia; Suraj Pandey, University of Melbourne, Australia). *IEEE International Conference on Cluster, Cloud and Grid Computing (CCGrid)*, 2010.

   (xxi) Posters Chair. *IEEE International Conference on Cluster, Cloud and Grid Computing (CCGrid)*, 2010.

   (xxii) Tutorials Chair. *IEEE International Conference on High Performance Interconnects (HotI)*, 2009.

   (xxiii) Publicity Chair. *International Workshop on High-Performance, Power-Aware Computing (HP-PAC)*, 2008. (held in conjunction with the IEEE International Parallel and Distributed Processing Symposium (IPDPS)).

Technical Committees

1. ***Journal Editorial Boards:***

   (i) International Journal of Grid and High Performance Computing (IJGHPC): 2012 - present.

2. ***Conference Steering Committees:***
   (i) IEEE/ACM International Conference for High Performance Computing, Networking, Storage and Analysis (SC): 2012 - 2014.
   (ii) International Supercomputing Conference (ISC): 2012 - present.
   (iii) International Workshop on Accelerators and Hybrid Exascale Systems (AsHES): 2012 - present.
   (iv) IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (CCGrid): 2011 - present.
   (v) International Workshop on Characterization of Accelerator-based Computing on High-End Systems (CACHES): 2011.
3. ***Proposal Review Committees:***
   (i) National Science Foundation (NSF), Computer Systems Research (CSR) panel, May, 2012.
   (ii) National Science Foundation (NSF), Computer Systems Research (CSR) panel, April, 2012.
   (iii) Czech Science Foundation, 2011.
   (iv) Department of Energy (DOE), Office of Science Advanced Scientific Computing Research (ASCR), 2011.
   (v) National Science Foundation (NSF), Computer Systems Research (CSR) panel, April, 2010.
4. ***Program Committee for International Conferences and Workshops:***
   (i) SIAM Parallel Processing: 2014.
   (ii) IEEE International Conference on Big Data (BigData): 2013.
   (iii) Workshop on Multicore and GPU Programming Models, Languages and Compilers (PLC): 2013.
   (iv) Euro-Par, International Conference on Parallel Processing: 2013.
   (v) International Workshop on Large-Scale Parallel Processing (LSPP): 2013.
   (vi) International Conference on Cloud Research and Innovation (ICCRI): 2013.
   (vii) International Workshop on Parallel Algorithm and Parallel Software (IWPAPS): 2012
   (viii) IEEE International Conference on Networks (ICON): 2012
   (ix) International Conference on P2P, Parallel, Grid, Cloud and Internet Computing (PGCIC): 2012
   (x) International Conference on Advances in Cloud Computing (ACC): 2012
   (xi) International Workshop on Collaborative Cloud (CollabCloud): 2012
   (xii) International Workshop on Advances in High-Performance Algorithms and Applications (AHPAA): 2012
   (xiii) European MPI Users' Group Meeting (Euro MPI): 2012, 2013
   (xiv) ACM International Conference on Computing Frontiers (CF): 2012
   (xv) International Workshop on Network-aware Data Management (NDM): 2011, 2012
   (xvi) International Workshop on Cloud Computing and Scientific Applications (CCSA): 2011, 2012
   (xvii) Partitioned Global Address Space Conference (PGAS): 2011
   (xviii) International Workshop on High-level Parallel Programming and Applications (HLPP): 2011, 2013
   (xix) International Workshop on Performance Modeling, Benchmarking and Simulation of High Performance Computing Systems (PMBS): 2011, 2012, 2013
   (xx) IEEE International Conference on High Performance Computing and Communications (HPCC): 2011, 2012
   (xxi) International Conference on Contemporary Computing (IC3): 2011, 2012
   (xxii) IEEE International Conference on Computational Science and Engineering (CSE): 2011
   (xxiii) International Supercomputing Conference (ISC): 2011, 2012, 2013
   (xxiv) International Workshop on Communication Architecture for Scalable Systems (CASS): 2011, 2012, 2013
   (xxv) International Workshop on High-Level Parallel Programming Models and Supportive Environments (HIPS): 2011
   (xxvi) IEEE International Symposium on Parallel and Distributed Processing with Applications (ISPA): 2011, 2012
   (xxvii) IEEE International Parallel and Distributed Processing Symposium (IPDPS): 2011, 2012

(xxviii) IEEE/ACM International Conference for High Performance Computing, Networking, Storage and Analysis (SC): 2010, 2011, 2012

(xxix) International Workshop on Multi-Core Computing Systems (MuCoCoS): 2010

(xxx) IEEE International Conference on Cluster Computing (Cluster): 2009, 2010

(xxxi) International Workshop on The Influence of I/O on Microprocessor Architecture (IOM): 2009

(xxxii) International Workshop on Communication Architecture for Clusters (CAC): 2009, 2010

(xxxiii) IEEE International Symposium on High-Performance Interconnects (HotI): 2008, 2009, 2011, 2012, 2013

(xxxiv) International Conference on Parallel Processing (ICPP): 2008, 2009, 2011, 2012

(xxxv) International Workshop on Scheduling and Resource Management for Parallel and Distributed Systems (SRMPDS): 2007, 2008, 2009, 2010, 2011, 2012

(xxxvi) IEEE International Conference on High Performance Computing (HiPC): 2007, 2008, 2009, 2010, 2011, 2012, 2013

(xxxvii) IEEE International Conference on Computer Communications and Networks (ICCCN): 2006, 2007, 2008

5. ***Other Committees:***

(i) Workshops Committee: IEEE/ACM International Conference for High Performance Computing, Networking, Storage and Analysis (SC): 2013

(ii) Argonne/University of Chicago Computation Institute Director Renewal Review Committee: 2012

(iii) IEEE Computer Society, Future Technologies Strategies, Cloud Computing Committee: 2012

(iv) Recruitment and University Relations, Mathematics and Computer Science Division, Argonne National Laboratory: 2012

(v) IEEE TCPP Student Travel Award Committee: IEEE International Parallel and Distributed Processing Symposium (IPDPS): 2012

(vi) IEEE Technical Committee on Scalable Computing (TCSC), Award for Excellence Selection Committee: 2012

(vii) Ph.D. Forum Committee: IEEE International Parallel and Distributed Processing Symposium (IPDPS): 2011, 2012

(viii) Division Director Search Committee, Mathematics and Computer Science Division, Argonne National Laboratory, 2011

(ix) Student Research Symposium Judge: IEEE International Conference on High Performance Computing (HiPC): 2010

(x) Birds-of-a-Feather Committee: International Supercomputing Conference (ISC): 2011, 2012

(xi) Poster Awards Committee: IEEE International Conference on Cluster, Cloud and Grid Computing (CCGrid): 2010

(xii) Student Research Symposium Committee: IEEE International Conference on High Performance Computing (HiPC): 2009, 2010

(xiii) Tutorials Committee: IEEE/ACM International Conference for High Performance Computing, Networking, Storage and Analysis (SC): 2009, 2011, 2012, 2013

(xiv) Posters Committee: IEEE International Conference on Cluster Computing (Cluster): 2009

(xv) Poster Awards Committee: IEEE International Conference on High Performance Computing (HiPC): 2009

(xvi) Book Proposal Review Committee, Taylor and Francis Group, 2007

(xvii) Departmental Awards Committee, Computer Science and Engineering, Ohio State University, 2006

6. ***Technical Referee for International Journals and Magazines:***

(i) International Journal of Parallel Programming (IJPP): 2013

(ii) ACM Transactions on Architecture and Code Optimization (TACO): 2012

(iii) Journal of Cluster Computing (CLUS): 2012

(iv) Future Generation Computer Systems (FGCS) Journal: 2012

(v) Institution of Engineering and Technology (IET) Computers & Digital Techniques Journal: 2012
(vi) Journal of Computer Science and Technology (JCST): 2012
(vii) Journal of Simulation Modelling Practice and Theory (SIMPAT): 2011, 2012
(viii) IEEE Computer Architecture Letters (CAL): 2009, 2010
(ix) IEEE Transactions on Networking (TN): 2009
(x) Journal of Future Generation Computer Systems (with Elsevier): 2009
(xi) Journal of Concurrency and Computation: Practice and Experience: 2009
(xii) Computer Networks Journal (COMNET): 2009, 2010, 2012
(xiii) IBM Systems Journal: 2008
(xiv) IEEE Micro: 2007
(xv) IEEE Transactions on Parallel and Distributed Systems (TPDS): 2006, 2007, 2008, 2009, 2010, 2011, 2012
(xvi) IEEE Transactions on Computers (TC): 2006, 2007, 2008
(xvii) Electronics and Telecommunications Research Institute Journal (ETRI): 2006
(xviii) Journal of Grid Computing (Grid): 2005
(xix) Journal of Parallel and Distributed Computing (JPDC): 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013

7. ***Other Organizational Positions:***

(i) Session Chair. IEEE/ACM International Conference on Utility and Cloud Computing (UCC): 2012.
(ii) Session Chair. International Supercomputing Conference (ISC): 2012
(iii) Session Chair. International Workshop on Communication Architecture for Scalable Systems (CASS): 2011
(iv) Session Chair. International Workshop on High-Level Parallel Programming Models and Supportive Environments (HIPS): 2011
(v) Session Chair. IEEE International Parallel and Distributed Processing Symposium (IPDPS): 2011, 2012
(vi) Session Chair. IEEE International Conference on Cluster, Cloud and Grid Computing (CCGrid): 2010, 2011, 2012
(vii) Session Chair. IEEE International Conference on High Performance Computing (HiPC): 2008, 2010, 2011
(viii) Session Chair. IEEE/ACM International Conference for High Performance Computing, Networking, Storage and Analysis (SC): 2007, 2009
(ix) Session Chair. International Conference on Parallel Processing (ICPP): 2007, 2012
(x) Session Chair. Workshop on Performance Optimization for High-Level Languages and Libraries (POHLL): 2007
(xi) Session Chair. Workshop on Communication Architecture for Clusters (CAC): 2007, 2008
(xii) Session Chair. IEEE International Conference on Computer Communications and Networks (ICCCN): 2006, 2008, 2009

8. ***Additional Reviewer for Conferences and Workshops:***

(i) Workshop on Resiliency in High Performance Computing (Resilience): 2011
(ii) International European Conference on Parallel and Distributed Computing (Euro-Par): 2011
(iii) International Symposium on Computer Architecture and High Performance Computing (SBAC-PAD): 2011
(iv) ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming (PPoPP): 2010
(v) IEEE International Conference on Computer Communications (INFOCOM): 2009
(vi) IEEE International Symposium on High-Performance Interconnects (HotI): 2007
(vii) ACM International Conference on Supercomputing (ICS): 2007, 2010
(viii) IEEE International Conference on Autonomic and Trusted Computing (ATC): 2007
(ix) IEEE/ACM International Conference for High Performance Computing, Networking, Storage and Analysis (SC): 2005, 2007, 2008

(x) IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS): 2005
(xi) IEEE Symposium on High-Performance Computer Architecture (HPCA): 2005
(xii) IEEE Symposium on High Performance Distributed Computing (HPDC): 2004, 2005, 2007, 2008
(xiii) IEEE International Parallel and Distributed Processing Symposium (IPDPS): 2004, 2005, 2006
(xiv) International Workshop on RDMA: Applications, Implementations and Technologies (RAIT): 2004, 2005
(xv) IEEE International Conference on Cluster Computing (Cluster): 2003, 2004, 2005
(xvi) International Workshop on Communication Architecture for Clusters (CAC): 2003, 2004, 2005

Panel Moderator

1. *Is Big Data the New HPC?* International Conference on Parallel Processing (ICPP), Pittsburgh, Pennsylvania. Sep. 12th, 2012.
2. *Is Exascale End-of-the-line for Commodity Networks?* International Conference on Cluster Computing (Cluster), Austin, Texas. Sep. 27th, 2011.
3. *Scheduling Primitives.* ASCR Exascale Programming Models Workshop, Marina del Rey, California. Jul 27th, 2011.
4. *Accelerators: Fad, Fashion or Future?* Jointly with Wu-chun Feng, Virginia Tech. International Conference on Parallel Processing (ICPP), San Diego, California. Sep. 15th, 2010.
5. *Is Hybrid Programming a Bad Idea Whose Time has Come?* Third International Workshop on Parallel Programming Models and Systems Software for High-End Computing (P2S2), San Diego, California. Sep. 13th, 2010.
6. *Software for the ExaFlop Era: The Demons & The Dementors.* First International Workshop on Parallel Programming Models and Systems Software for High-End Computing (P2S2), Portland, Oregon. Sep. 12th, 2008.

Birds of a Feather Session Organizer

1. *Application Grand Challenges in the Heterogeneous Accelerator Era.* Jointly with Satoshi Matsuoka (Tokyo Institute of Technology, Japan). IEEE/ACM International Conference for High Performance Computing, Networking, Storage and Analysis (SC), Seattle, Washington. Nov. 17th, 2012.
2. *Unistack: Interoperable Community Runtime Environment for Exascale Systems.* Jointly with Laxmikant Kale (University of Illinois at Urbana-Champaign). IEEE/ACM International Conference for High Performance Computing, Networking, Storage and Analysis (SC), Seattle, Washington. Nov. 15th, 2012.
3. *Critically Missing Pieces in Heterogeneous Accelerator Computing.* Jointly with Satoshi Matsuoka (Tokyo Institute of Technology, Japan). IEEE/ACM International Conference for High Performance Computing, Networking, Storage and Analysis (SC), Seattle, Washington. Nov. 15th, 2012.
4. *MPICH: A High Performance and Portable MPI Implementation.* Jointly with Darius T. Buntinas (Argonne National Laboratory) and Rajeev S. Thakur (Argonne National Laboratory). IEEE/ACM International Conference for High Performance Computing, Networking, Storage and Analysis (SC), Seattle, Washington. Nov. 17th, 2012.
5. *Application Grand Challenges in the Heterogeneous Accelerator Era.* Jointly with Satoshi Matsuoka (Tokyo Institute of Technology, Japan). IEEE/ACM International Conference for High Performance Computing, Networking, Storage and Analysis (SC), Seattle, Washington. Nov. 17th, 2011.
6. *Critically Missing Pieces in Heterogeneous Accelerator Computing.* Jointly with Satoshi Matsuoka (Tokyo Institute of Technology, Japan). IEEE/ACM International Conference for High Performance Computing, Networking, Storage and Analysis (SC), Seattle, Washington. Nov. 15th, 2011.
7. *Critically Missing Pieces in Heterogeneous Exascale Computing.* Jointly with Satoshi Matsuoka (Tokyo Institute of Technology, Japan). IEEE/ACM International Conference for High Performance Computing, Networking, Storage and Analysis (SC), New Orleans, Louisiana. Nov. 16th, 2010.

Supervision

1. ***Staff Supervision:***

(i) *Antonio J. Peña*

- Postdoctoral Research Associate, Argonne National Laboratory. Period: 02/2013–present.

(ii) *Ralf Gunter Correa Carvalho*

- Professional Research Associate, University of Chicago. Period: 09/2012–present.

(iii) *David J. Goodell*

- Software Development Specialist, Argonne National Laboratory. Period: 06/2012–present.

(iv) *James S. Dinan*

- James Wallace Givens Postdoctoral Fellow, Argonne National Laboratory. Period: 09/2011–present.
- Postdoctoral Research Associate, Argonne National Laboratory. Period: 09/2010–08/2011.

(v) *Darius T. Buntinas*

- Software Development Specialist, Argonne National Laboratory. Period: 06/2012–01/2013.

2. ***Student Advisees:***

(i) Huiwei Lv, Ph.D. student, Institute of Computing Technologies, Chinese Academy of Sciences (ICT-CAS), China. *KMI: An Efficient Distributed Domain Specific Language for Genome Assembly and Mapping Applications.* Period: 11/2012–04/2013. (Mentor: Fangfang Xia)

(ii) Yan Li, Ph.D. student, Institute of Software, Chinese Academy of Sciences (ISCAS), China. *Optimizing Communication in Hybrid MPI+GPU Environments.* Period: 05/2012–04/2013.

(iii) David Ozog, Ph.D. student, Department of Computer Science, University of Oregon (UO), USA. *Scalability Enhancements to NWChem for Blue Gene/Q.* Period: 06/2012–11/2012. (Mentor: Jeffrey R. Hammond)

(iv) Palden Lama, Ph.D. student, Department of Computer Science, University of Colorado, Colorado Springs (UCCS), USA. *Resource Monitoring and Management of Virtual GPUs on Cloud Computing Systems.* Period: 05/2012–11/2012.

(v) Xin Zhao, Ph.D. student, Department of Computer Science, University of Illinois at Urbana-Champaign (UIUC), USA. *Design Alternatives for Active Messages in MPI.* Period: 05/2012–08/2012. (Mentor: Darius T. Buntinas).

(vi) Ziaul Haque Olive, Ph.D. student, Department of Computer Science, University of San Antonio, Texas (UTSA), USA. *Exploring Compiler Analysis based Refactoring of Legacy MPI Applications.* Period: 05/2012–08/2012.

(vii) Md. Humayun Arafat, Ph.D. student, Departmant of Computer Science and Engineering, Ohio State University (OSU), USA. *CPU/GPU Co-Scheduling of Accelerated Task Parallel Computations.* Period: 06/2011–09/2011. (second-level supervisor; first-level supervisor was James S. Dinan).

(viii) Qingpeng Niu, Ph.D. student, Departmant of Computer Science and Engineering, Ohio State University (OSU), USA. *A Global Address Space Approach to Automated Data Management for Parallel Quantum Monte Carlo Applications.* Period: 06/2011–09/2011. (second-level supervisor; first-level supervisor was James S. Dinan).

(ix) Li Rao, M.S. student, Institute of Software, Chinese Academy of Sciences (ISCAS), China. *Optimizing MPI Collective Communication for NUMA Architectures.* Period: 05/2011–08/2011.

(x) Lukasz Wesolowski, Ph.D. student, Department of Computer Science, University of Illinois at Urbana-Champaign (UIUC), USA. *Optimizing integrated inter-node and GPU communication for collective communication.* Period: 05/2011–08/2011.

(xi) Feng Ji, Ph.D. student, Department of Computer Science, North Carolina State University (NCSU), USA. *Optimizing integrated MPI and GPU data movement for intra-node communication.* Period: 05/2011–08/2011.

(xii) John Jenkins, Ph.D. student, Department of Computer Science, North Carolina State University (NCSU), USA. *Optimizing integrated inter-node and GPU communication for non-contiguous data communication.* Period: 05/2011–08/2011.

(xiii) Ashwin M. Aji, Ph.D. student, Department of Computer Science, Virginia Tech (VT), USA. *Integrated Data Management for MPI and GPUs*. Period: 06/2011–08/2011.

(xiv) Shucai Xiao, Ph.D. student, Department of Electrical and Computer Engineering, Virginia Tech (VT), USA. *Virtualized Task Management for GPUs on Cloud Computing Systems.* Period: 01/2011–06/2011.

(xv) Sreeram Potluri, Ph.D. student, Department of Computer Science and Engineering, Ohio State University (OSU), USA. *Studying the Potential of MPI RMA as a Runtime Infrastructure for Global Address Space Languages.* Period: 06/2010–09/2010. (Mentor: Jeffrey R. Hammond).

(xvi) Piotr Fidkowski, Ph.D. student, Department of Structural and Computational Engineering, Massachusetts Institute of Technology (MIT), USA. *Understanding the Impact of Hybrid MPI-GPU Capabilities for Solid Mechanics Applications.* Period: 05/2010–08/2010.

(xvii) James S. Dinan, Ph.D. student, Department of Computer Science and Engineering, Ohio State University (OSU), USA. *Analyzing Hybrid MPI-UPC Programming.* Period: 06/2009–09/2009.

(xviii) Gopalakrishnan Santhanaraman, Ph.D. student, Department of Computer Science and Engineering, Ohio State University (OSU), USA. *Truly One-sided RMA Operations in MPI.* Period: 06/2008–09/2008.

(xix) Ping Lai, Ph.D. student, Department of Computer Science and Engineering, Ohio State University (OSU), USA. *ProOnE: A General Purpose Protocol Onload Engine.* Period: 06/2008–09/2008.

(xx) Rajesh Sudarsan, Ph.D. student, Department of Computer Science, Virginia Tech (VT), USA. *A Component-based Process Manager for MPICH2.* Period: 05/2007–08/2007.

(xxi) Thomas R. W. Scogland, Ph.D. student, Department of Computer Science, Virginia Tech (VT), USA. *Efficient Boot-strap Capabilities for MPI Processes.* Period: 05/2007–08/2007.

(xxii) Ganesh Narayanaswamy, M.S. student, Department of Computer Science, Virginia Tech (VT), USA. *MPICH2 over Qlogic PSM.* Period: 05/2006–08/2006.

3. ***Thesis Committees:***

   (i) Chao Mei (Ph.D.). *Message-driven Parallel Language Runtime Design and Optimizations for Multicore-based Massively Parallel Machines.* Advisor: Laxmikant Kale. Department of Computer Science, University of Illinois at Urbana-Champaign (UIUC), USA, 2012.

   (ii) Shucai Xiao (Ph.D.). *Generalizing the Utility of Graphics Processing Units in Large-Scale Heterogeneous Computing Systems.* Advisor: Wu-chun Feng. Department of Electrical and Computer Engineering, Virginia Tech (VT), USA, 2012.

   (iii) Rishi Kaushal Prasad (M.S.). *PHOENICS: Portable High Performance Framework for Reliable UDP Communications.* Advisor: Wu-chun Feng. Department of Computer Science, Virginia Tech (VT), USA, 2010.

   (iv) Ajeet Singh (M.S.). *GePSeA: A General-Purpose Software Acceleration Framework for Lightweight Task Offloading.* Advisor: Wu-chun Feng. Department of Computer Science, Virginia Tech (VT), USA, 2009.

   (v) Gopalakrishnan Santhanaraman (Ph.D.). *Designing Scalable and High-Performance One Sided Communication Middleware for Modern Interconnects.* Advisor: Dhabaleswar K. Panda. Department of Computer Science and Engineering, Ohio State University (OSU), USA, 2009.

   (vi) Ganesh Narayanaswamy (M.S.). *On the Interaction of High-Performance Network Protocol Stacks with Multicore Architectures.* Advisor: Wu-chun Feng. Department of Computer Science, Virginia Tech (VT), USA, 2008.

4. ***Long-Term Visiting Staff:***

   (i) *Yuqing Xiong*. Researcher, Computer Science Department, Shanghai Institute of Technology (SIT), Shanghai, China. Period: 01/2013–01/2014.

   (ii) *Yanjie Wei*. Associate Professor, High Performance Computing Center, Shenzhen Institute of Advanced Technologies (SIAT), Chinese Academy of Sciences, China. Period: 07/2012–08/2012.

Professional Memberships and Other Affiliations

1. Senior Member, IEEE (2012 – present)
2. Professional Member, IEEE Computer Society (2012 – present)
3. MPI Forum: The Message Passing Interface Standardizing Body.
   - Hybrid Programming Working Group Chair. Period: 2008 – present.
   - Member. Period: 2007 – present.

4. Professional Member, IEEE (2007 – 2011)
5. Professional Member, ACM (2007 – present)
6. Student Member, IEEE (2001 – 2006)
7. Student Member, ACM (2001 – 2006)

REFERENCES

Available on Request