

Torsten Hoefler

"Wherever you go, go with all your heart." – Confucius

Education

- 2005–2008 **Ph.D., Computer Science (Dr. rer. nat.)**, *Indiana University, USA*,
GPA: 4.0/4.0 (summa cum laude).
Committee: [Andrew Lumsdaine](#), Randall Bramley, Jack Dongarra, Richard Graham, Minaxi Gupta
- 2000–2004 **Diplom, Informatik (Master of CS)**, *Chemnitz University of Technology, Germany*,
Grade: sehr gut (very good) – Universitätspreis 2005 (best student in class of 2005).
Advisor: Wolfgang Rehm
- 1993–1999 **Gymnasium (Academic High School)**, *Gymnasium Oelsnitz, Germany*,
Graduated top of class (3rd best among 90 students).

Awards and Stipends

- 2010 **Best Paper Finalist SC'10**, Best Paper Finalist at Supercomputing 2010.
- 2010 **Best Paper LSAP'10**, Best Paper at the 2010 ACM Workshop on Large-Scale System and Application Performance.
- 2008 **Best Paper LCI'09**, 2nd Best Paper at the Linux Cluster Institute Conference 2009.
- 2008 **Cluster Challenge SC'08**, Co-advised the winning team at IEEE/ACM SC08's Cluster Challenge.
- 2008 **Travel award CCGrid'08**, IEEE/TCSC Doctoral Symposium for Cluster Computing and the Grid 2008.
- 2007–2008 **Fellowship for Doctoral Studies (tuition and stipend)**, Indiana University and Cisco Systems.
- 2006 **Fellowship for Doctoral Studies**, Saxon Ministry of Science and the Fine Arts (Sächsisches Ministerium für Wissenschaft und Kunst - SMWK), (Extension Declined).
- 2005 **Universitätspreis 2005 (Best Student Award)**, Chemnitz University of Technology.
- 2005 **Quantum Mechanical Computations (Individual Project Funding)**, AMD Saxony.
- 2005 **PARS Nachwuchspreis 2005 (PARS Junior Researcher Award)**, Group of Parallel Algorithms, Computer Architectures and System Software in the German Computer Society (Gesellschaft für Informatik, GI).

Experience

Research

- 2010–present **Application and System Performance Modeling and Simulation Lead**, Blue Waters Directorate, NCSA, University of Illinois at Urbana-Champaign, USA. .
Modelling and Simulation of Sustained Petaflop Applications for Blue Waters, MPI Forum Activities. Scientific advisors: Marc Snir, Bill Gropp.

- 2008–2010 **Postdoctoral Fellow**, Open Systems Lab, Indiana University, USA.
Parallel Programming, Modelling and Network Research, MPI Forum Activities. Scientific advisor: Andrew Lumsdaine.
- 2007–2008 **Research Assistant**, Open Systems Lab, Indiana University, USA.
Parallel Computing and Networking Research
- Jan 2007 **Visiting Researcher**, Commissariat à l'Énergie Atomique, Direction des Applications Militaires (CEA-DAM), France.
Parallel Quantum-Mechanical Computations with ABINIT
- Summer 2006 **Visiting Researcher**, Open Systems Lab, Indiana University, USA.
Nonblocking Collective Operations in MPI, Open MPI, LibNBC
- Dec 2005 **Visiting Researcher**, CINECA Consorzio Interuniversitario, Italy.
Parallel Ab-Initio Quantum Mechanics Computations
- 2004–2007 **Research Assistant**, Chemnitz University of Technology, Germany.
Parallel Ab-Initio Quantum Mechanical Computations, Networking Research

Teaching/Advising

- 2009 **Advisor**, Indiana University.
Advised various Master Students Research Projects
- 2008 **IEEE/ACM Supercomputing 2008 Cluster Challenge**, Indiana University.
Preparing (the winning) IU/TUD team of undergraduate students for the challenge at SC'08.
- 2007 **IEEE/ACM Supercomputing 2007 Cluster Challenge**, Indiana University.
Preparing the IU team of undergraduate students for the challenge at SC'07.
- 2005–2006 **Advisor**, University of Technology Chemnitz.
Advised eight Master Students ("Diplomarbeiten")
- 2002–2004 **Teaching Assistant**, University of Technology Chemnitz.
Tutoring Students and Grading Exams
- 2002–2005 **Tutor**, Promind GmbH Chemnitz.
Advanced Vocational Training

Engineering

- 2000–2005 **Software Engineer**, DELTA proveris AG.
Design and Implementation of Database and Web Applications

Languages

- German **native language**
English **fluent**
Latin **basic (Latinum)**

Journal Publications and Book Chapters (peer-reviewed)

T. Hoefler. Software and Hardware Techniques for Power-Efficient HPC Networking. *Computing in Science and Engineering (CiSE)*, Dec. 2010. Accepted for publication.

T. Hoefler, R. Rabenseifner, H. Ritzdorf, B. R. de Supinski, R. Thakur, , and J. L. Traeff. The Scalable Process Topology Interface of MPI 2.2. *Concurrency and Computation: Practice and Experience*, Dec. 2010. Accepted for publication.

T. Hoefler, T. Schneider, and A. Lumsdaine. Accurately Measuring Overhead, Communication

Time and Progression of Blocking and Nonblocking Collective Operations at Massive Scale. *International Journal of Parallel, Emergent and Distributed Systems*, 25(4):241–258, Jul. 2010.

T. Hoefler, T. Schneider, and A. Lumsdaine. The Effect of Network Noise on Large-Scale Collective Communications. *Parallel Processing Letters (PPL)*, 19(4):573–593, Aug. 2009.

T. Hoefler, T. Schneider, and A. Lumsdaine. LogGP in Theory and Practice - An In-depth Analysis of Modern Interconnection Networks and Benchmarking Methods for Collective Operations. *Elsevier Journal of Simulation Modelling Practice and Theory (SIMPAT)*, Jun. 2009.

T. Hoefler, P. Gottschling, A. Lumsdaine, and W. Rehm. Optimizing a Conjugate Gradient Solver with Non-Blocking Collective Operations. *Elsevier Journal of Parallel Computing (PARCO)*, 33(9):624–633, Sep. 2007.

T. Hoefler, R. Janisch, and W. Rehm. Improving the parallel scaling of ABINIT. In *Science and Supercomputing in Europe*, pages 551–559. CINECA Conorzio Interuniversitario, Dec. 2005.

T. Hoefler, R. Janisch, and W. Rehm. A Performance Analysis of ABINIT on a Cluster System. In *Parallel Algorithms and Cluster Computing*, pages 37–51. Springer, Lecture Notes in Computational Science and Engineering, Dec. 2005.

Peer-reviewed Conference Publications

T. Hoefler, T. Schneider, and A. Lumsdaine. Characterizing the Influence of System Noise to Large-Scale Applications by Simulation. Nov. 2010. Accepted at International Conference for High Performance Computing, Networking, Storage and Analysis (SC'10).

J. Willcock, T. Hoefler, N. Edmonds, and A. Lumsdaine. AM++: A Generalized Active Message Framework. Sep. 2010. Accepted at The Nineteenth International Conference on Parallel Architectures and Compilation Techniques (PACT'10).

T. Hoefler, G. Bronevetsky, B. Barrett, B. R. de Supinski, and A. Lumsdaine. Efficient MPI Support for Advanced Hybrid Programming Models. Sep. 2010. Accepted at the 17th European MPI Users Group conference (EuroMPI'10).

T. Hoefler, W. Gropp, R. Thakur, and J. L. Traeff. Toward Performance Models of MPI Implementations for Understanding Application Scaling Issues. Sep. 2010. Accepted at the 17th European MPI Users Group conference (EuroMPI'10).

T. Hoefler and S. Gottlieb. Parallel Zero-Copy Algorithms for Fast Fourier Transform and Conjugate Gradient using MPI Datatypes. Sep. 2010. Accepted at the 17th European MPI Users Group conference (EuroMPI'10).

T. Hoefler, C. Siebert, and A. Lumsdaine. Scalable Communication Protocols for Dynamic Sparse Data Exchange. In *Proceedings of the 2010 ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming*, pages 159–168. ACM, Jan. 2010.

P. Kambadur, A. Gupta, T. Hoefler, and A. Lumsdaine. Demand-driven Execution of Static Directed Acyclic Graphs Using Task Parallelism. Dec. 2009. Accepted at the 2009 International Conference on High Performance Computing, HIPC'09.

T. Hoefler, C. Siebert, and A. Lumsdaine. Group Operation Assembly Language - A Flexible Way to Express Collective Communication. In *ICPP-2009 - The 38th International Conference on Parallel Processing*. IEEE, Sep. 2009.

T. Hoefler, A. Lumsdaine, and J. Dongarra. Towards Efficient MapReduce Using MPI. In *Recent Advances in Parallel Virtual Machine and Message Passing Interface, 16th European PVM/MPI Users' Group Meeting, EuroPVM/MPI'09*. Springer, Sep. 2009.

J. Mueller, T. Schneider, J. Domke, R. Geyer, M. Haesing, T. Hoefler, S. Hoehlig, G. Juckeland, A. Lumsdaine, M. Mueller, and W. Nagel. Cluster Challenge 2008: Optimizing Cluster Configuration and Applications to Maximize Power Efficiency. In *Proceedings of the 10th LCI International Conference on High-Performance Clustered Computing, LCI'09*, Mar. 2009. Awarded as the 2nd best paper at LCI 2009.

- T. Hoefler, T. Schneider, and A. Lumsdaine. Multistage Switches are not Crossbars: Effects of Static Routing in High-Performance Networks. In *Proceedings of the 2008 IEEE International Conference on Cluster Computing, CLUSTER'08*. IEEE Computer Society, Oct. 2008.
- T. Hoefler and A. Lumsdaine. Message Progression in Parallel Computing - To Thread or not to Thread? In *Proceedings of the 2008 IEEE International Conference on Cluster Computing, CLUSTER'08*. IEEE Computer Society, Oct. 2008.
- T. Hoefler, M. Schellmann, S. Gorchatch, and A. Lumsdaine. Communication Optimization for Medical Image Reconstruction Algorithms. In *Recent Advances in Parallel Virtual Machine and Message Passing Interface, 15th European PVM/MPI Users' Group Meeting, EuroPVM/MPI'08*, volume LNCS 5205, pages 75–83. Springer, Sep. 2008.
- T. Hoefler, F. Lorenzen, and A. Lumsdaine. Sparse Non-Blocking Collectives in Quantum Mechanical Calculations. In *Recent Advances in Parallel Virtual Machine and Message Passing Interface, 15th European PVM/MPI Users' Group Meeting, EuroPVM/MPI'08*, volume LNCS 5205, pages 55–63. Springer, Sep. 2008.
- P. Geoffray and T. Hoefler. Adaptive Routing Strategies for Modern High Performance Networks. In *16th Annual IEEE Symposium on High Performance Interconnects, HOTI'08*, pages 165–172. IEEE Computer Society, Aug. 2008.
- T. Hoefler, P. Gottschling, and A. Lumsdaine. Leveraging Non-blocking Collective Communication in High-performance Applications. In *Proceedings of the Twentieth Annual Symposium on Parallelism in Algorithms and Architectures, SPAA'08*, pages 113–115. Association for Computing Machinery (ACM), Jun. 2008.
- T. Hoefler and A. Lumsdaine. Overlapping Communication and Computation with High Level Communication Routines. In *Proceedings of the 8th IEEE Symposium on Cluster Computing and the Grid, CCGrid'08*, May 2008.
- T. Hoefler, A. Lumsdaine, and W. Rehm. Implementation and Performance Analysis of Non-Blocking Collective Operations for MPI. In *In proceedings of the 2007 International Conference on High Performance Computing, Networking, Storage and Analysis, SC07*. IEEE Computer Society/ACM, Nov. 2007.
- T. Hoefler, P. Kambadur, R. L. Graham, G. Shipman, and A. Lumsdaine. A Case for Standard Non-Blocking Collective Operations. In *Recent Advances in Parallel Virtual Machine and Message Passing Interface, EuroPVM/MPI'07*, volume 4757, pages 125–134. Springer, Oct. 2007.
- T. Hoefler, T. Mehlan, A. Lumsdaine, and W. Rehm. Netgauge: A Network Performance Measurement Framework. In *Proceedings of High Performance Computing and Communications, HPCC'07*, volume 4782, pages 659–671. Springer, Sep. 2007.
- T. Hoefler, R. Janisch, and W. Rehm. Parallel scaling of Teter's minimization for Ab Initio calculations. Nov. 2006. Presented at the workshop HPC Nano in conjunction with the IEEE international conference on Supercomputing (SC'06).
- T. Hoefler, P. Gottschling, W. Rehm, and A. Lumsdaine. Optimizing a Conjugate Gradient Solver with Non-Blocking Collective Operations. In *Proceedings of Recent Advantages in Parallel Virtual Machine and Message Passing Interface, EuroPVM/MPI'06*, pages 374–382. Springer, Sep. 2006.
- T. Hoefler, C. Viertel, T. Mehlan, F. Mietke, and W. Rehm. Assessing Single-Message and Multi-Node Communication Performance of InfiniBand. In *Proceedings of IEEE International Conference on Parallel Computing in Electrical Engineering (PARELEC'06)*, pages 227–232. IEEE Computer Society, Sep. 2006.
- T. Mehlan, J. Strunk, T. Hoefler, F. Mietke, and W. Rehm. IRS - A portable Interface for Reconfigurable Systems. In *Proceedings of IEEE International Conference on Parallel Computing in Electrical Engineering, (PARELEC'06)*, pages 187–191. IEEE Computer Society, Sep. 2006.

F. Mietke, R. Baumgartl, R. Rex, T. Mehlan, T. Hoefler, and W. Rehm. Analysis of the Memory Registration Process in the Mellanox InfiniBand Software Stack. In *Proceedings of Euro-Par 2006 Parallel Processing*, pages 124–133. Springer-Verlag Berlin, Aug. 2006.

Peer-reviewed Workshop Publications

T. Hoefler, T. Schneider, and A. Lumsdaine. LogGOPSim - Simulating Large-Scale Applications in the LogGOPS Model. Jun. 2010. Accepted at the ACM Workshop on Large-Scale System and Application Performance (LSAP 2010).

T. Hoefler, J. Willcock, A. Chauhan, and A. Lumsdaine. The Case for Collective Pattern Specification. Jun. 2010. Accepted at the 1st ACM Workshop on Advances in Message Passing (AMP'10).

T. Hoefler and J. L. Traeff. Sparse Collective Operations for MPI. In *Proceedings of the 23rd IEEE International Parallel & Distributed Processing Symposium, HIPS'09 Workshop*, May 2009.

T. Hoefler, T. Schneider, and A. Lumsdaine. The Impact of Network Noise at Large-Scale Communication Performance. In *Proceedings of the 23rd IEEE International Parallel & Distributed Processing Symposium, LSPP'09 Workshop*, May 2009.

C. Kaiser, T. Hoefler, B. Bierbaum, and T. Bemmerl. Implementation and Analysis of Non-blocking Collective Operations on SCI Networks. In *Proceedings of the 23rd IEEE International Parallel & Distributed Processing Symposium, CAC'09 Workshop*, May 2009.

T. Hoefler, T. Schneider, and A. Lumsdaine. A Power-Aware, Application-Based, Performance Study Of Modern Commodity Cluster Interconnection Networks. In *Proceedings of the 23rd IEEE International Parallel & Distributed Processing Symposium, CAC'09 Workshop*, May 2009.

T. Hoefler, T. Schneider, and A. Lumsdaine. Accurately Measuring Collective Operations at Massive Scale. In *Proceedings of the 22nd IEEE International Parallel & Distributed Processing Symposium, PMEO'08 Workshop*, Apr. 2008.

T. Hoefler and A. Lumsdaine. Optimizing non-blocking Collective Operations for InfiniBand. In *Proceedings of the 22nd IEEE International Parallel & Distributed Processing Symposium, CAC'08 Workshop*, Apr. 2008.

T. Hoefler, A. Lichei, and W. Rehm. Low-Overhead LogGP Parameter Assessment for Modern Interconnection Networks. In *Proceedings of the 21st IEEE International Parallel & Distributed Processing Symposium, PMEO'07 Workshop*. IEEE Computer Society, Mar. 2007.

T. Hoefler, C. Siebert, and W. Rehm. A practically constant-time MPI Broadcast Algorithm for large-scale InfiniBand Clusters with Multicast. In *Proceedings of the 21st IEEE International Parallel & Distributed Processing Symposium, CAC'07 Workshop*, page 232. IEEE Computer Society, Mar. 2007.

T. Hoefler, J. Squyres, W. Rehm, and A. Lumsdaine. A Case for Non-Blocking Collective Operations. In *Frontiers of High Performance Computing and Networking - ISPA'06 Workshops*, volume 4331/2006, pages 155–164. Springer Berlin / Heidelberg, Dec. 2006.

T. Hoefler, J. Squyres, G. Fagg, G. Bosilca, W. Rehm, and A. Lumsdaine. A New Approach to MPI Collective Communication Implementations. In *Distributed and Parallel Systems (DAP-SYS'06) - From Cluster to Grid Computing*, pages 45–54. Springer, Sep. 2006.

T. Hoefler, T. Mehlan, F. Mietke, and W. Rehm. Fast Barrier Synchronization for InfiniBand. In *Proceedings of the 20th IEEE International Parallel & Distributed Processing Symposium, CAC'06 Workshop*, Apr. 2006.

T. Hoefler, T. Mehlan, F. Mietke, and W. Rehm. LogfP - A Model for small Messages in InfiniBand. In *Proceedings of the 20th IEEE International Parallel & Distributed Processing Symposium, PMEO-PDS'06 Workshop*, Apr. 2006.

T. Hoefler, L. Cerquetti, T. Mehlan, F. Mietke, and W. Rehm. A practical approach to the rating of barrier algorithms using the LogP model and Open-MPI. In *Proceedings of the 2005*

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✉ htor@illinois.edu • <http://www.unix.de>

International Conference on Parallel Processing Workshops (ICPP'05), pages 562–569, Jun. 2005.

Other Publications (Technical Reports, Standard Proposals, etc.)

The MPI Forum. MPI: A Message-Passing Interface Standard, Version 2.2. Technical report, MPI Forum, 2009. (Chapters 5 (Collective Operations) and 7 (Process Topologies)).

T. Hoefler on behalf of the MPI Forum. MPI: A Message-Passing Interface Standard – Working-Draft for Nonblocking Collective Operations. Technical report, MPI Forum, Apr. 2009.

T. Schneider, T. Hoefler, and A. Lumsdaine. ORCS: An Oblivious Routing Congestion Simulator. Technical Report 675, Indiana University, Feb. 2009.

D. Gregor, T. Hoefler, and A. Lumsdaine. Dynamically-Sized Messages in MPI-3. Technical report, Open Systems Lab, Indiana University, Feb. 2008.

D. Gregor, T. Hoefler, B. Barrett, and A. Lumsdaine. Fixing Probe for Multi-Threaded MPI Applications. Technical Report 674, Indiana University, Jan. 2009.

T. Schneider, T. Hoefler, S. Wunderlich, T. Mehlan, and W. Rehm. An optimized ZGEMM implementation for the Cell BE. In *Proceedings of the 9th Workshop on Parallel Systems and Algorithms (PASA)*, Feb. 2008.

A. Friedley, T. Hoefler, M. Leininger, and A. Lumsdaine. Scalable High Performance Message Passing over InfiniBand for Open MPI. In *Proceedings of 3rd KiCC Workshop 2007*. RWTH Aachen, Dec. 2007.

T. Schneider, S. Wunderlich, W. Rehm, T. Hoefler, and H. Schick. Code Optimization for Cell/B.E. - Opportunities for ABINIT, Oct. 2007. Research Poster at the IBM CASCON 2006 Symposium, Dublin, Ireland.

T. Hoefler and G. Zerah. Transforming the high-performance 3d-FFT in ABINIT to enable the use of non-blocking collective operations. Technical report, Commissariat a l'Energie Atomique - Direction des applications militaires (CEA-DAM), Feb. 2007.

F. Mietke, D. Dunger, T. Mehlan, T. Hoefler, and W. Rehm. A native InfiniBand Transporter for MySQL Cluster. In *Proceedings of the 2nd Workshop 'Kommunikation in Clusterrechnern und Clusterverbundsystemen' (KiCC'07)*, Feb. 2007.

T. Hoefler, T. Mehlan, F. Mietke, and W. Rehm. Adding Low-Cost Hardware Barrier Support to Small Commodity Clusters. In *Proceedings of 19th International Conference on Architecture and Computing Systems - ARCS'06*, pages 343–250, Mar. 2006.

T. Hoefler and W. Rehm. A Communication Model for Small Messages with InfiniBand. In *PARS Mitteilungen*, pages 32–41. PARS, Jun. 2005. (Awarded with the PARS Junior Researcher Prize).

Selected Invited Talks

- Jun. 2010 **Nonblocking and Sparse Collective Operations on Petascale Computers**, *Argonne National Laboratory*, Chicago, IL, USA.
- Nov. 2009 **Selected MPI-2.2 and MPI-3 Features**, *MPICH Birds of a Feather*, Portland, OR, USA.
- Sep. 2009 **Improving Parallel Computing Platforms**, *Technical University of Munich*, Munich, Germany.
- Aug. 2008 **The Effects of Common Communication Patterns in Large-Scale Networks with Switch-Based Static Routing**, *Nerd Lunch at Cisco Systems*, San Jose, CA, USA.
- Aug. 2008 **Multistage Interconnection Networks are not Crossbars**, *Lawrence Berkeley National Laboratory*, Berkeley, CA, USA.

- Aug. 2008 **Non-blocking Collective Operations for MPI**, *Lawrence Livermore National Laboratory*, Livermore, CA, USA.
- Jun. 2008 **Towards Coordinated Optimization of Computation and Communication in Parallel Applications**, *Fakultät fuer Informatik, Universität Münster*, Münster, Germany.
- Dec. 2007 **Accurately Measuring Collective Operations at Massive Scale**, *C&C Research Laboratories, NEC Europe Ltd.*, Sankt Augustin, Germany.
- Dec. 2007 **Non-blocking Collectives for MPI-2**, *High Performance Computing Center Stuttgart (HLRS)*, Stuttgart, Germany.
- Jan. 2007 **Application Optimization with non-blocking Collectives**, *Commissariat a l'Energie Atomique - Direction des applications militaires*, Bruyeres-le-chatel, France.
- Jan. 2007 **Optimization of a parallel 3d-FFT with non-blocking Collective Operations**, *Invited to the 3rd International ABINIT Developer Workshop*, Liege, Belgium.
- Sep. 2005 **Fast Barrier Synchronization for InfiniBand**, *Technical University of Munich*, Munich, Germany.

Service

Standardization Committees

- 2010–present **MPI Forum**, *Representing University of Illinois at Urbana-Champaign, Chair of the Collective Operations and Topology Working Group for MPI-3.*
- 2007–2010 **MPI Forum**, *Representing Indiana University, Chair of the Collective Operations Working Group, Co-Author of the Chapter 5 (Collective Communication) and Chapter 7 (Process Topologies) in MPI-2.2.*

Chairmanships

MPI Forum Meetings, *MPI-3 Working Group for Collective Operations and Topology.*
Hot Interconnects 2010, *Tutorials Chair.*

Technical Program Committee Member (alphabetically)

AMP/PLDI – Advances in Message Passing, 2010.

CAC/IPDPS – Communication Architecture for Clusters, 2010.

CCGrid – IEEE Symposium on Cluster Computing and the Grid, 2009, 2010.

Cluster – IEEE Conference on Cluster Computing, 2010.

EuroPVM/MPI or EuroMPI, 2009, 2010.

HOTI – IEEE Hot Interconnects, 2009, 2010.

ICS – International Conference on Supercomputing, 2011.

IPDPS – IEEE Intl. Parallel & Distributed Processing Symposium, 2010.

P2S2/ICPP – Par. Progr. Models and Systems Software for High-End Comp., 2010.

SC – ACM/IEEE Conference on High Performance Computing, 2010.

Technical Program Committee Reviewer/Scientific Journal Reviewer

CAC/IPDPS – Communication Architecture for Clusters, 2008.

CISE – IEEE Computing in Science and Engineering, 2010.

Cluster – IEEE Conference on Cluster Computing, 2007, 2008, 2010.

Computer – IEEE Computer, 2009.

Euro-Par, 2010.

ICPP – Intl. Conference on Parallel Processing, 2010.

IJHPCA – Intl. Journal of High Performance Computing Applications, 2009.

IJPEDS – Intl. Journal of Parallel, Emergent and Distributed Systems, 2008.

IPDPS – IEEE Intl. Parallel & Distributed Processing Symposium, 2008, 2009, 2010.

SC – ACM/IEEE Conference on High Performance Computing, 2007, 2008, 2009, 2010.

SPAA – Symposium on Parallelism in Algorithms and Architectures, 2009.

TPDS – IEEE Transactions on Parallel and Distributed Systems, 2008, 2009.

Organized Workshops

1st Blue Waters Performance Modeling Workshop, Organized a performance modeling workshop with speakers from the Los Alamos National Laboratory for early users of the Blue Waters Petascale system, Urbana, IL, 2010.

3rd KiCC Workshop, Co-Organized 3rd workshop on Kommunikation in Clusterrechnern und Clusterverbundsystemen, Aachen 2007.

2nd KiCC Workshop, Co-Organized 2nd workshop on Kommunikation in Clusterrechnern und Clusterverbundsystemen, Chemnitz 2007.

1st KiCC Workshop, Co-Organized 1st workshop on Kommunikation in Clusterrechnern und Clusterverbundsystemen, Chemnitz 2005.

Professional Organizations

IEEE Computer Society, Member.

Association for Computing Machinery (ACM), Member.

Significant Projects

Research Projects

2010–present **NSF Blue Waters**, Sustained Petaflop Computing with the Blue Waters machine. Responsible for Modelling and Simulation of Parallel Petaflop Applications.

2008–2010 **DOE CIFTS**, Coordinated and Improved Fault Tolerance for High Performance Computing Systems.

2007–2010 **DOE FAST-OS II**, Forum to Address Scalable Technology for Runtime and Operating Systems.

2005–2006 **CHiC**, Co-Design and Procurement of the Chemnitzer Hochleistungs-Linux-Cluster, project volume 2.6 + 1.7 Million Euro, 528 diskless InfiniBand nodes, 8.2 TFlop/s (73.4% HPL efficiency) #117 in Top 500 June 2007.

Software Projects

2008–present **LogGOPSim**, Network performance simulator using the LogGOPS model.

2006–present **Netgauge**, Network performance measurement tool (open source).

2008 **ORCS**, Oblivious Routing Congestion Simulator (finished successfully).

2006–2008 **LibNBC**, Implementation of Nonblocking Collective Operations (finished successfully).

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- 2006–2008 **Open MPI**, *Open source MPI implementation (contributed to collectives framework)*.
2005–2006 **ABINIT**, *Quantum mechanical computation software (contributed to parallelization)*.

References

Advisors (Ph.D., Postdoctoral)

- 2007–2010 **Andrew Lumsdaine**, (*Indiana University*).
2010–present **Marc Snir, William Gropp**, (*University of Illinois at Urbana-Champaign*).

Recent Co-authors and Collaborators (alphabetically)

Brian Barrett, George Bosilca, Greg Bronevetsky, Arun Chauhan, Nick Edmonds, Steven Gottlieb, William Gropp, Jack Dongarra, Patrick Geffray, Sergei Gorlatch, Peter Gottschling, Douglas Gregor, Andrew Lumsdaine, Christian Siebert, Bronis R. de Supinsky, Rajeev Thakur, Jesper Larsson Traeff, Jeff Squyres, Jeremiah Willcock, Gilles Zerah