

Abhinav Bhatele

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Education

- 2010 **Ph.D., Computer Science**, *University of Illinois at Urbana-Champaign, Urbana, Illinois, USA.*
- 2007 **M.S., Computer Science**, *University of Illinois at Urbana-Champaign, Urbana, Illinois, USA.*
- 2005 **B.Tech., Computer Science and Engineering**, *Indian Institute of Technology, Kanpur, INDIA.*

Research and Professional Experience

- 2019–present **University of Maryland, College Park**, *Assistant Professor.*
- 2018–2019 **Lawrence Livermore National Laboratory**, *Senior Computer Scientist.*
- 2012–2018 **Lawrence Livermore National Laboratory**, *Computer Scientist.*
- 2011–2012 **Lawrence Livermore National Laboratory**, *Post-doctoral Research Scholar.*
- 2010–2011 **University of Illinois at Urbana-Champaign**, *Post-doctoral Research Associate.*
- 2005–2010 **University of Illinois at Urbana-Champaign**, *Graduate Research Assistant.*
- Summer 2007 **IBM Thomas J. Watson Research Center**, *Research Intern.*
- Summer 2006 **IBM Thomas J. Watson Research Center**, *Research Intern.*

Awards and Honors

- 2019 Technical University Munich (TUM) Institute for Advanced Study Visiting Fellow
- 2017, 2018 Outstanding Mentor Award, Lawrence Livermore National Laboratory
- 2018 **Early and Mid-Career Recognition Award**, Lawrence Livermore National Laboratory
- 2018 Best Student Paper Finalist, SC '18, Dallas, TX
- 2017 NERSC Award for Innovative Use of High Performance Computing
- 2017 Deputy Director for S&T Excellence in Publication Award, LLNL
- 2017 Finalist, 10th IEEE International Scalable Computing Challenge (SCALE 2017)
- 2016 Best Paper Award, IPDPS '16, Chicago, IL
- 2014 Best Report award, AX Division, Lawrence Livermore National Laboratory
- 2014 **IEEE TCSC Award for Excellence in Scalable Computing** for Early Career Researchers
- 2013 One of the U.S. delegates to the 1st Heidelberg Laureate Forum 2013, Heidelberg, Germany
- 2013 Best Paper Award, IPDPS '13, Boston, MA
- 2012 Best Poster Award (1st Place), Computation Postdoc Poster Symposium, LLNL
- 2011 Member of winning team for HPC Challenge Class II Award, SC '11, Seattle, WA
- 2011 **David J. Kuck Outstanding Ph.D. Thesis Award**, Dept. of Computer Science, Univ. of Illinois
- 2011 Invited Panelist, High Performance Computing and Communications (HPCC '11), Banff, Canada
- 2010 Feng Chen Memorial Best Paper Award, Dept. of Computer Science, Univ. of Illinois
- 2010 Teacher Scholar Certificate, Center of Teaching Excellence, Univ. of Illinois
- 2010 Graduate Teacher Certificate, Center of Teaching Excellence, Univ. of Illinois
- 2009 **ACM/IEEE-CS George Michael Memorial HPC Fellowship**, SC '09, Portland, OR
- 2009 Distinguished Paper Award, Euro-Par '09, Delft, The Netherlands
- 2009 David J. Kuck Outstanding M.S. Thesis Award, Dept. of Computer Science, Univ. of Illinois
- 2008 Best Graduate Poster (3rd Place) at the ACM Student Research Competition, SC '08

Peer Reviewed Publications

Journal Publications

- [1] Alfredo Giménez, Todd Gamblin, Ilir Jusufi, **Abhinav Bhatele**, Martin Schulz, Peer-Timo Bremer, and Bernd Hamann. MemAxes: Visualization and analytics for characterizing complex memory performance behaviors. *IEEE Transactions on Visualization and Computer Graphics*, 24(7):2180–2193, July 2018. LLNL-JRNL-. [✉ http://doi.ieeecomputersociety.org/10.1109/TVCG.2017.2718532](http://doi.ieeecomputersociety.org/10.1109/TVCG.2017.2718532).
- [2] Harsh Bhatia, Nikhil Jain, **Abhinav Bhatele**, Yarden Livnat, Jens Domke, Valerio Pascucci, and Peer-Timo Bremer. Interactive investigation of traffic congestion on fat-tree networks using TreeScope. *Computer Graphics Forum*, 37(3):561–572, June 2018. LLNL-JRNL-. [✉ https://onlinelibrary.wiley.com/doi/pdf/10.1111/cgf.13442](https://onlinelibrary.wiley.com/doi/pdf/10.1111/cgf.13442).
- [3] Erik W. Draeger, Xavier Andrade, John A. Gunnels, **Abhinav Bhatele**, Andre Schleife, and Alfredo A. Correa. Massively parallel first-principles simulation of electron dynamics in materials. *Journal of Parallel and Distributed Computing*, 106:205–214, February 2017. [✉ http://www.sciencedirect.com/science/article/pii/S0743731517300734](http://www.sciencedirect.com/science/article/pii/S0743731517300734).
- [4] Katherine E. Isaacs, Todd Gamblin, **Abhinav Bhatele**, Martin Schulz, Bernd Hamann, and Peer-Timo Bremer. Ordering traces logically to identify lateness in message-passing programs. *IEEE Transactions on Parallel and Distributed Systems*, 27(3):829–840, March 2016. LLNL-JRNL-668754. [✉ http://doi.ieeecomputersociety.org/10.1109/TPDS.2015.2417531](http://doi.ieeecomputersociety.org/10.1109/TPDS.2015.2417531).
- [5] Katherine E. Isaacs, Peer-Timo Bremer, Ilir Jusufi, Todd Gamblin, **Abhinav Bhatele**, Martin Schulz, and Bernd Hamann. Combing the communication hairball: Visualizing parallel execution traces using logical time. *IEEE Transactions on Visualization and Computer Graphics*, 20(12):2349–2358, December 2014. LLNL-JRNL-657418. [✉ http://doi.ieeecomputersociety.org/10.1109/TVCG.2014.2346456](http://doi.ieeecomputersociety.org/10.1109/TVCG.2014.2346456).
- [6] Steven Langer, **Abhinav Bhatele**, and Charles H. Still. pF3D simulations of laser-plasma interactions in National Ignition Facility experiments. *Computing in Science and Engineering*, 16(6):42–50, November 2014. LLNL-JRNL-648736. [✉ http://doi.ieeecomputersociety.org/10.1109/MCSE.2014.79](http://doi.ieeecomputersociety.org/10.1109/MCSE.2014.79).
- [7] Aaditya G. Landge, Joshua A. Levine, Katherine E. Isaacs, **Abhinav Bhatele**, Todd Gamblin, Martin Schulz, Steve H. Langer, Peer-Timo Bremer, and Valerio Pascucci. Visualizing network traffic to understand the performance of massively parallel simulations. *IEEE Transactions on Visualization and Computer Graphics*, 18(12):2467–2476, December 2012. LLNL-CONF-543359. [✉ http://doi.ieeecomputersociety.org/10.1109/TVCG.2012.286](http://doi.ieeecomputersociety.org/10.1109/TVCG.2012.286).
- [8] Gengbin Zheng, **Abhinav Bhatele**, Esteban Meneses, and Laxmikant V. Kalé. Periodic hierarchical load balancing for large supercomputers. *Int. J. High Perform. Comput. Appl.*, 25(4):371–385, November 2011. [✉ http://hpc.sagepub.com/content/25/4/371](http://hpc.sagepub.com/content/25/4/371).
- [9] **Abhinav Bhatele**, Eric Bohm, and Laxmikant V. Kale. Optimizing communication for Charm++ applications by reducing network contention. *Concurrency and Computation: Practice and Experience*, 23(2):211–222, February 2011. [✉ https://onlinelibrary.wiley.com/doi/abs/10.1002/cpe.1637](https://onlinelibrary.wiley.com/doi/abs/10.1002/cpe.1637).
- [10] **Abhinav Bhatele**, Lukasz Wesolowski, Eric Bohm, Edgar Solomonik, and Laxmikant V. Kalé. Understanding application performance via micro-benchmarks on three large supercomputers: Intrepid, Ranger and Jaguar. *Int. J. High Perform. Comput. Appl.*, 24(4):411–427, November 2010. [✉ http://hpc.sagepub.com/content/24/4/411](http://hpc.sagepub.com/content/24/4/411).
- [11] **Abhinav Bhatele** and Laxmikant V. Kale. Quantifying network contention on large parallel machines. *Parallel Processing Letters*, 19(04):553–572, December 2009. [✉ http://www.worldscientific.com/doi/abs/10.1142/S0129626409000419](http://www.worldscientific.com/doi/abs/10.1142/S0129626409000419).
- [12] **Abhinav Bhatele** and Laxmikant V. Kale. Benefits of topology aware mapping for mesh interconnects. *Parallel Processing Letters*, 18(04):549–566, December 2008. [✉ http://www.worldscientific.com/doi/abs/10.1142/S0129626408003569](http://www.worldscientific.com/doi/abs/10.1142/S0129626408003569).

- [13] Eric Bohm, **Abhinav Bhatele**, Laxmikant V. Kalé, Mark E. Tuckerman, Sameer Kumar, John A. Gunnels, and Glenn J. Martyna. Fine-grained parallelization of the Car-Parrinello ab initio molecular dynamics method on the IBM Blue Gene/L supercomputer. *IBM J. Res. Dev.*, 52(1/2):159–175, January 2008. <http://ieeexplore.ieee.org/xpl/articleDetails.jsp?tp=&arnumber=5388634>.
- [14] Sameer Kumar, Chao Huang, Gengbin Zheng, Eric Bohm, **Abhinav Bhatele**, James C. Phillips, Hao Yu, and Laxmikant V. Kalé. Scalable molecular dynamics with NAMD on the IBM Blue Gene/L system. *IBM J. Res. Dev.*, 52(1/2):177–188, January 2008. <http://ieeexplore.ieee.org/xpl/articleDetails.jsp?tp=&arnumber=5388644>.

Conference Publications

- [15] **Abhinav Bhatele**, Stephanie Brink, and Todd Gamblin. Hatchet: Pruning the overgrowth in parallel profiles. In *Proceedings of the ACM/IEEE International Conference for High Performance Computing, Networking, Storage and Analysis, SC '19*, November 2019 (to appear). LLNL-CONF-772402.
- [16] **Abhinav Bhatele**, Nikhil Jain, Misbah Mubarak, and Todd Gamblin. Analyzing cost-performance tradeoffs of HPC network designs under different constraints using simulations. In *Proceedings of the ACM SIGSIM Conference on Principles of Advanced Discrete Simulation, PADS '19*. IEEE Computer Society, June 2019. LLNL-CONF-772399.
- [17] Emilio Castillo, Nikhil Jain, Marc Casas, Miquel Moreto, Martin Schulz, Ramon Bievide, Mateo Valero, and **Abhinav Bhatele**. Optimizing computation-communication overlap in asynchronous task-based programs. In *Proceedings of the International Conference on Supercomputing, ICS '19*, June 2019. LLNL-CONF-772400.
- [18] Samuel A. Pollard, Nikhil Jain, Stephen Herbein, and **Abhinav Bhatele**. Evaluation of an interference-free node allocation policy on fat-tree clusters. In *Proceedings of the ACM/IEEE International Conference for High Performance Computing, Networking, Storage and Analysis, SC '18*. IEEE Computer Society, November 2018. LLNL-CONF-745526.
- [19] Staci A. Smith, Clara Cromey, David K. Lowenthal, Jens Domke, Nikhil Jain, Jayaraman J. Thiagarajan, and **Abhinav Bhatele**. Mitigating inter-job interference using adaptive flow-aware routing. In *Proceedings of the ACM/IEEE International Conference for High Performance Computing, Networking, Storage and Analysis, SC '18*. IEEE Computer Society, November 2018. LLNL-CONF-745538.
- [20] Kevin A. Brown, Nikhil Jain, Satoshi Matsuoka, Martin Schulz, and **Abhinav Bhatele**. Interference between I/O and MPI traffic on fat-tree networks. In *Proceedings of the International Conference on Parallel Processing, ICPP '18*, August 2018. LLNL-CONF-751958. <http://doi.acm.org/10.1145/3225058.3225144>.
- [21] Jayaraman J. Thiagarajan, Nikhil Jain, Rushil Anirudh, Alfredo Giménez, Rahul Sridhar, Aniruddha Marathe, Tao Wang, Murali Emani, **Abhinav Bhatele**, and Todd Gamblin. Bootstrapping parameter space exploration for fast tuning. In *Proceedings of the International Conference on Supercomputing, ICS '18*, June 2018. LLNL-CONF-750296. <http://doi.acm.org/10.1145/3205289.3205321>.
- [22] Jayaraman J. Thiagarajan, Rushil Anirudh, Bhavya Kailkhura, Nikhil Jain, Tanzima Islam, **Abhinav Bhatele**, Jae-Seung Yeom, and Todd Gamblin. PADDLE: Performance analysis using a data-driven learning environment. In *Proceedings of the IEEE International Parallel & Distributed Processing Symposium, IPDPS '18*. IEEE Computer Society, May 2018. LLNL-CONF-740303. <http://doi.ieeecomputersociety.org/10.1109/IPDPS.2018.00088>.
- [23] Misbah Mubarak, Nikhil Jain, Jens Domke, Noah Wolfe, Caitlin Ross, Jianping Li, **Abhinav Bhatele**, Christopher D. Carothers, Kwan-Liu Ma, and Robert B. Ross. Toward reliable validation of HPC interconnect simulations. In *Proceedings of the Winter Simulation Conference, WSC '17*, December 2017. LLNL-CONF-733848. <https://dl.acm.org/citation.cfm?id=3242231>.
- [24] Alfredo Giménez, Todd Gamblin, **Abhinav Bhatele**, Chad Wood, Kathleen Shoga, Aniruddha Marathe, Peer-Timo Bremer, Bernd Hamann, and Martin Schulz. ScrubJay: Deriving knowledge from the disarray of hpc performance data. In *Proceedings of the ACM/IEEE International Conference for*

- High Performance Computing, Networking, Storage and Analysis*, SC '17. IEEE Computer Society, November 2017. LLNL-CONF-735962. <http://doi.acm.org/10.1145/3126908.3126935>.
- [25] Nikhil Jain, **Abhinav Bhatele**, Louis Howell, David Böhme, Ian Karlin, Edgar Leon, Misbah Mubarak, Noah Wolfe, Todd Gamblin, and Matthew Leininger. Predicting the performance impact of different fat-tree configurations. In *Proceedings of the ACM/IEEE International Conference for High Performance Computing, Networking, Storage and Analysis*, SC '17. IEEE Computer Society, November 2017. LLNL-CONF-736289. <http://doi.acm.org/10.1145/3126908.3126967>.
- [26] Aniruddha Marathe, Rushil Anirudh, Nikhil Jain, **Abhinav Bhatele**, Jayaraman Thiagarajan, Bhavya Kailkhura, Jae-Seung Yeom, Barry Rountree, and Todd Gamblin. Performance modeling under resource constraints using deep transfer learning. In *Proceedings of the ACM/IEEE International Conference for High Performance Computing, Networking, Storage and Analysis*, SC '17. IEEE Computer Society, November 2017. LLNL-CONF-736726. <http://doi.acm.org/10.1145/3126908.3126969>.
- [27] Misbah Mubarak, Philip Carns, Jonathan Jenkins, Jianping Li, Nikhil Jain, Shane Snyder, Robert B. Ross, Christopher D. Carothers, **Abhinav Bhatele**, and Kwan-Liu Ma. Quantifying I/O and communication traffic interference on dragonfly networks equipped with burst buffers. In *Proceedings of the IEEE Cluster Conference*, Cluster '17, September 2017. LLNL-CONF-731482. <http://doi.ieeecomputersociety.org/10.1109/CLUSTER.2017.25>.
- [28] **Abhinav Bhatele**, Jae-Seung Yeom, Nikhil Jain, Chris J. Kuhlman, Yarden Livnat, Keith R. Bisset, Laxmikant V. Kale, and Madhav V. Marathe. Massively parallel simulations of spread of infectious diseases over realistic social networks. In *Proceedings of the IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing*, CCGrid '17 SCALE Challenge. IEEE Computer Society, May 2017. LLNL-CONF-690723. <http://doi.ieeecomputersociety.org/10.1109/CCGRID.2017.141>.
- [29] Nikhil Jain, **Abhinav Bhatele**, Xiang Ni, Todd Gamblin, and Laxmikant V. Kale. Partitioning low-diameter networks to eliminate inter-job interference. In *Proceedings of the IEEE International Parallel & Distributed Processing Symposium*, IPDPS '17. IEEE Computer Society, May 2017. LLNL-CONF-706801. <http://doi.ieeecomputersociety.org/10.1109/IPDPS.2017.91>.
- [30] Noah Wolfe, Misbah Mubarak, Nikhil Jain, Jens Domke, **Abhinav Bhatele**, Christopher D. Carothers, and Robert B. Ross. Preliminary performance analysis of multi-rail fat-tree networks. In *Proceedings of the IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing*, CCGrid '17. IEEE Computer Society, May 2017. LLNL-CONF-713054. <http://doi.ieeecomputersociety.org/10.1109/CCGRID.2017.102>.
- [31] Tanzima Z. Islam, Jayaraman J. Thiagarajan, **Abhinav Bhatele**, Martin Schulz, and Todd Gamblin. A machine learning framework for performance coverage analysis of proxy applications. In *Proceedings of the ACM/IEEE International Conference for High Performance Computing, Networking, Storage and Analysis*, SC '16. IEEE Computer Society, November 2016. LLNL-CONF-696018. <http://doi.ieeecomputersociety.org/10.1109/SC.2016.45>.
- [32] Nikhil Jain, **Abhinav Bhatele**, Samuel T. White, Todd Gamblin, and Laxmikant V. Kale. Evaluating HPC networks via simulation of parallel workloads. In *Proceedings of the ACM/IEEE International Conference for High Performance Computing, Networking, Storage and Analysis*, SC '16. IEEE Computer Society, November 2016. LLNL-CONF-690662. <http://doi.ieeecomputersociety.org/10.1109/SC.2016.13>.
- [33] Edgar A. Leon, Ian Karlin, **Abhinav Bhatele**, Steven H. Langer, Chris Chembreau, Louis H. Howell, Trent D'Hooge, and Matthew L. Leininger. Characterizing parallel scientific applications on commodity clusters: An empirical study of a tapered fat-tree. In *Proceedings of the ACM/IEEE International Conference for High Performance Computing, Networking, Storage and Analysis*, SC '16. IEEE Computer Society, November 2016. LLNL-CONF-681011. <http://doi.ieeecomputersociety.org/10.1109/SC.2016.77>.
- [34] **Abhinav Bhatele**, Nikhil Jain, Yarden Livnat, Valerio Pascucci, and Peer-Timo Bremer. Analyzing network health and congestion in dragonfly-based supercomputers. In *Proceedings of the IEEE International Parallel & Distributed Processing Symposium*, IPDPS '16. IEEE Computer Society, May

2016. LLNL-CONF-678293. <http://doi.ieeecomputersociety.org/10.1109/IPDPS.2016.123>.
- [35] Erik Draeger, Xavier Andrade, John Gunnels, **Abhinav Bhatele**, Andre Schleife, and Alfredo Correa. Massively parallel first-principles simulation of electron dynamics in materials. In *Proceedings of the IEEE International Parallel & Distributed Processing Symposium, IPDPS '16*. IEEE Computer Society, May 2016. LLNL-CONF-669964. <http://doi.ieeecomputersociety.org/10.1109/IPDPS.2016.46>.
- [36] Katherine E. Isaacs, **Abhinav Bhatele**, Jonathan Lifflander, David Böhme, Todd Gamblin, Martin Schulz, Bernd Hamann, and Peer-Timo Bremer. Recovering logical structure from Charm++ event traces. In *Proceedings of the ACM/IEEE International Conference for High Performance Computing, Networking, Storage and Analysis, SC '15*. IEEE Computer Society, November 2015. LLNL-CONF-670046. <http://doi.acm.org/10.1145/2807591.2807634>.
- [37] **Abhinav Bhatele**, Andrew R. Titus, Jayaraman J. Thiagarajan, Nikhil Jain, Todd Gamblin, Peer-Timo Bremer, Martin Schulz, and Laxmikant V. Kale. Identifying the culprits behind network congestion. In *Proceedings of the IEEE International Parallel & Distributed Processing Symposium, IPDPS '15*. IEEE Computer Society, May 2015. LLNL-CONF-663150. <http://doi.ieeecomputersociety.org/10.1109/IPDPS.2015.92>.
- [38] Nikhil Jain, **Abhinav Bhatele**, Jae-Seung Yeom, Mark F. Adams, Francesco Miniati, Chao Mei, and Laxmikant V. Kale. Charm++ & MPI: Combining the best of both worlds. In *Proceedings of the IEEE International Parallel & Distributed Processing Symposium, IPDPS '15*. IEEE Computer Society, May 2015. LLNL-CONF-663041. <http://doi.ieeecomputersociety.org/10.1109/IPDPS.2015.102>.
- [39] **Abhinav Bhatele**, Nikhil Jain, Katherine E. Isaacs, Ronak Buch, Todd Gamblin, Steven H. Langer, and Laxmikant V. Kale. Optimizing the performance of parallel applications on a 5D torus via task mapping. In *Proceedings of the IEEE International Conference on High Performance Computing, HiPC '14*. IEEE Computer Society, December 2014. LLNL-CONF-655465. <http://doi.ieeecomputersociety.org/10.1109/HiPC.2014.7116706>.
- [40] Ahmed Abdel-Gawad, Mithuna Thottethodi, and **Abhinav Bhatele**. RAHTM: Routing-algorithm aware hierarchical task mapping. In *Proceedings of the ACM/IEEE International Conference for High Performance Computing, Networking, Storage and Analysis, SC '14*. IEEE Computer Society, November 2014. LLNL-CONF-653568. <http://doi.ieeecomputersociety.org/10.1109/SC.2014.32>.
- [41] Alfredo Giménez, Todd Gamblin, Barry Rountree, **Abhinav Bhatele**, Ilir Jusufi, Peer-Timo Bremer, and Bernd Hamann. Dissecting on-node memory access performance: A semantic approach. In *Proceedings of the ACM/IEEE International Conference for High Performance Computing, Networking, Storage and Analysis, SC '14*. IEEE Computer Society, November 2014. LLNL-CONF-658626. <http://doi.ieeecomputersociety.org/10.1109/SC.2014.19>.
- [42] Nikhil Jain, **Abhinav Bhatele**, Xiang Ni, Nicholas J. Wright, and Laxmikant V. Kale. Maximizing throughput on a dragonfly network. In *Proceedings of the ACM/IEEE International Conference for High Performance Computing, Networking, Storage and Analysis, SC '14*. IEEE Computer Society, November 2014. LLNL-CONF-653557. <http://doi.ieeecomputersociety.org/10.1109/SC.2014.33>.
- [43] Katherine E. Isaacs, Alfredo Giménez, Ilir Jusufi, Todd Gamblin, **Abhinav Bhatele**, Martin Schulz, Bernd Hamann, and Peer-Timo Bremer. State of the art of performance visualization. In R. Borgo, R. Maciejewski, and I. Viola, editors, *Proceedings of the Eurographics Conference of Visualization (STARs)*, EuroVis '14. The Eurographics Association, June 2014. LLNL-CONF-652873. <http://dx.doi.org/10.2312/eurovisstar.20141177>.
- [44] Jae-Seung Yeom, **Abhinav Bhatele**, Keith R. Bisset, Eric Bohm, Abhishek Gupta, Laxmikant V. Kale, Madhav Marathe, Dimitrios S. Nikolopoulos, Martin Schulz, and Lukasz Wesolowski. Overcoming the scalability challenges of epidemic simulations on Blue Waters. In *Proceedings of the IEEE International*

Parallel & Distributed Processing Symposium, IPDPS '14. IEEE Computer Society, May 2014. LLNL-CONF-648533. <http://doi.ieeecomputersociety.org/10.1109/IPDPS.2014.83>.

- [45] **Abhinav Bhatele**, Kathryn Mohror, Steven H. Langer, and Katherine E. Isaacs. There goes the neighborhood: performance degradation due to nearby jobs. In *Proceedings of the ACM/IEEE International Conference for High Performance Computing, Networking, Storage and Analysis, SC '13*. IEEE Computer Society, November 2013. LLNL-CONF-635776. <http://doi.acm.org/10.1145/2503210.2503247>.
- [46] Nikhil Jain, **Abhinav Bhatele**, Michael P. Robson, Todd Gamblin, and Laxmikant V. Kale. Predicting application performance using supervised learning on communication features. In *Proceedings of the ACM/IEEE International Conference for High Performance Computing, Networking, Storage and Analysis, SC '13*. IEEE Computer Society, November 2013. LLNL-CONF-635857. <http://doi.acm.org/10.1145/2503210.2503263>.
- [47] Ian Karlin, **Abhinav Bhatele**, Jeff Keasler, Bradford L. Chamberlain, Jonathan Cohen, Zachary DeVito, Riyaz Haque, Dan Laney, Edward Luke, Felix Wang, David Richards, Martin Schulz, and Charles H. Still. Exploring traditional and emerging parallel programming models using a proxy application. In *Proceedings of the IEEE International Parallel & Distributed Processing Symposium, IPDPS '13*. IEEE Computer Society, May 2013. LLNL-CONF-586774. <http://doi.ieeecomputersociety.org/10.1109/IPDPS.2013.115>.
- [48] **Abhinav Bhatele**, Todd Gamblin, Katherine E. Isaacs, Brian T. N. Gunney, Martin Schulz, Peer-Timo Bremer, and Bernd Hamann. Novel views of performance data to analyze large-scale adaptive applications. In *Proceedings of the ACM/IEEE International Conference for High Performance Computing, Networking, Storage and Analysis, SC '12*. IEEE Computer Society, November 2012. LLNL-CONF-554552. <http://doi.ieeecomputersociety.org/10.1109/SC.2012.80>.
- [49] **Abhinav Bhatele**, Todd Gamblin, Steven H. Langer, Peer-Timo Bremer, Erik W. Draeger, Bernd Hamann, Katherine E. Isaacs, Aaditya G. Landge, Joshua A. Levine, Valerio Pascucci, Martin Schulz, and Charles H. Still. Mapping applications with collectives over sub-communicators on torus networks. In *Proceedings of the ACM/IEEE International Conference for High Performance Computing, Networking, Storage and Analysis, SC '12*. IEEE Computer Society, November 2012. LLNL-CONF-556491. <http://doi.ieeecomputersociety.org/10.1109/SC.2012.75>.
- [50] Laercio Pilla, Christiane Ribeiro, Daniel Cordeiro, Chao Mei, **Abhinav Bhatele**, Philippe Navaux, Francois Broquedis, Jean-Francois Mehaut, and Laxmikant V. Kale. Hierarchical approach for load balancing on parallel multi-core systems. In *Proceedings of the International Conference on Parallel Processing, ICPP '12*, September 2012. LLNL-CONF-536171. <http://doi.ieeecomputersociety.org/10.1109/ICPP.2012.9>.
- [51] Vivek Kale, **Abhinav Bhatele**, and William D. Gropp. Weighted locality-sensitive scheduling for mitigating noise on multi-core clusters. In *International Conference on High-Performance Computing, HiPC '11*. IEEE Computer Society, December 2011. LLNL-CONF-492091. <http://doi.ieeecomputersociety.org/10.1109/HiPC.2011.6152722>.
- [52] Ehsan Totoni, **Abhinav Bhatele**, Eric J. Bohm, Nikhil Jain, Celso L. Mendes, Ryan M. Mokos, Gengbin Zheng, and Laxmikant V. Kale. Simulation-based performance analysis and tuning for a two-level directly connected system. In *Proceedings of the 17th IEEE International Conference on Parallel and Distributed Systems, ICPADS '11*. IEEE Computer Society, December 2011. LLNL-CONF-500821. <http://doi.ieeecomputersociety.org/10.1109/ICPADS.2011.121>.
- [53] **Abhinav Bhatele**, Nikhil Jain, William D. Gropp, and Laxmikant V. Kale. Avoiding hot-spots on two-level direct networks. In *Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis, SC '11*. ACM, November 2011. LLNL-CONF-491454. <http://doi.acm.org/10.1145/2063384.2063486>.
- [54] Edgar Solomonik, **Abhinav Bhatele**, and James Demmel. Improving communication performance in dense linear algebra via topology aware collectives. In *Proceedings of the International Conference*

for High Performance Computing, Networking, Storage and Analysis, SC '11. ACM, November 2011. LLNL-CONF-491442. <http://doi.acm.org/10.1145/2063384.2063487>.

- [55] **Abhinav Bhatele**, Pritish Jetley, Hormozd Gahvari, Lukasz Wesolowski, William D. Gropp, and Laxmikant Kale. Architectural constraints to attain 1 Exaflop/s for three scientific application classes. In *Proceedings of the IEEE International Parallel & Distributed Processing Symposium*, IPDPS '11. IEEE Computer Society, May 2011. <http://doi.ieeecomputersociety.org/10.1109/IPDPS.2011.18>.
- [56] **Abhinav Bhatele**, Gagan R. Gupta, Laxmikant V. Kale, and I-Hsin Chung. Automated mapping of regular communication graphs on mesh interconnects. In *Proceedings of IEEE International Conference on High Performance Computing*, HiPC '10. IEEE Computer Society, December 2010. <http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=6152722>.
- [57] **Abhinav Bhatele**, Eric Bohm, and Laxmikant V. Kalé. A case study of communication optimizations on 3D mesh interconnects. In *Proceedings of the 15th International Euro-Par Conference on Parallel Processing*, Euro-Par '09, pages 1015–1028. Springer-Verlag, August 2009. <http://www.springerlink.com/content/m7x082004w806435>.
- [58] **Abhinav Bhatele**, Laxmikant V. Kalé, and Sameer Kumar. Dynamic topology aware load balancing algorithms for molecular dynamics applications. In *Proceedings of the 23rd international conference on Supercomputing*, ICS '09. ACM, June 2009. <http://doi.acm.org/10.1145/1542275.1542295>.
- [59] **Abhinav Bhatele**, Sameer Kumar, Chao Mei, James C. Phillips, Gengbin Zheng, and Laxmikant V. Kale. Overcoming scaling challenges in biomolecular simulations across multiple platforms. In *Proceedings of the IEEE International Symposium on Parallel and Distributed Processing*, IPDPS '08. IEEE Computer Society, April 2008. <http://doi.ieeecomputersociety.org/10.1109/IPDPS.2008.4536317>.

Workshop Publications

- [60] Kevin Brown, Tianqi Xu, Keita Iwabuchi, Kento Sato, Adam Moody, Kathryn Mohror, Nikhil Jain, **Abhinav Bhatele**, Martin Schulz, Roger Pearce, Maya Gokhale, and Satoshi Matsuoka. Accelerating big data infrastructure and applications (ongoing collaboration). In *Proceedings of the first US-Japan Workshop on Collaborative Global Research on Applying Information Technology*, June 2017. LLNL-CONF-727471.
- [61] Huu Tan Nguyen, **Abhinav Bhatele**, Peer-Timo Bremer, Todd Gamblin, Martin Schulz, Lai Wei, David Böhme, and Kwan-Liu Ma. VIPACT: A visualization interface for analyzing calling context trees. In *Proceedings of the 3rd Workshop on Visual Performance Analysis*, VPA '16, November 2016. LLNL-CONF-704659. <https://doi.org/10.1109/VPA.2016.9>.
- [62] Jae-Seung Yeom, Jayaraman J. Thiagarajan, **Abhinav Bhatele**, Greg Bronevetsky, and Tzanio Kolev. Data-dependent performance modeling of linear solvers for sparse matrices. In *Proceedings of the 7th International Workshop in Performance Modeling, Benchmarking and Simulation of High Performance Computer Systems*, PMBS '16, November 2016. LLNL-CONF-704087. <http://doi.ieeecomputersociety.org/10.1109/PMBS.2016.009>.
- [63] Aniruddha Marathe, Hormozd Gahvari, Jae-Seung Yeom, and **Abhinav Bhatele**. libPowerMon: A lightweight profiling framework to profile program context and system-level metrics. In *Proceedings of the 12th Workshop on High-Performance, Power-Aware Computing*, HPPAC '16. IEEE Computer Society, May 2016. LLNL-CONF-681427. <http://doi.ieeecomputersociety.org/10.1109/IPDPSW.2016.199>.
- [64] Bilge Acun, Nikhil Jain, **Abhinav Bhatele**, Misbah Mubarak, Christopher D. Carothers, and Laxmikant V. Kale. Preliminary evaluation of a parallel trace replay tool for hpc network simulations. In *Proceedings of the 3rd Workshop on Parallel and Distributed Agent-Based Simulations*, PADABS '15, August 2015. LLNL-CONF-667225.
- [65] Collin M. McCarthy, Katherine E. Isaacs, **Abhinav Bhatele**, Peer-Timo Bremer, and Bernd Hamann. Visualizing the five-dimensional torus network of the IBM Blue Gene/Q. In *Proceedings of the 1st*

Workshop on Visual Performance Analysis, VPA '14, November 2014. LLNL-CONF-661000. <http://doi.ieeecomputersociety.org/10.1109/VPA.2014.10>.

- [66] Steven Langer, **Abhinav Bhatele**, Todd Gamblin, Bert Still, Denise Hinkel, Mike Kumbara, Bruce Langdon, and Ed Williams. Simulating laser-plasma interaction in experiments at the national ignition facility on a Cray XE6. In *Cray User Group Meeting, CUG '12*, April 2012. LLNL-PROC-547711.
- [67] **Abhinav Bhatele** and Laxmikant V. Kale. Heuristic-based techniques for mapping irregular communication graphs to mesh topologies. In *Proceedings of the Workshop on Extreme Scale Computing APplication Enablement - Modeling and Tools, ESCAPE '11*, September 2011. LLNL-CONF-491311.
- [68] Martin Schulz, **Abhinav Bhatele**, Peer-Timo Bremer, Todd Gamblin, Katherine Isaacs, Joshua A. Levine, and Valerio Pascucci. Creating a tool set for optimizing topology-aware node mappings. In Holger Brunst, Matthias S. Müller, Wolfgang E. Nagel, and Michael M. Resch, editors, *Tools for High Performance Computing 2011*. Springer Berlin Heidelberg, September 2011. LLNL-CONF-402937. http://link.springer.com/chapter/10.1007/978-3-642-31476-6_1.
- [69] Gengbin Zheng, Esteban Meneses, **Abhinav Bhatele**, and Laxmikant V. Kale. Hierarchical load balancing for charm++ applications on large supercomputers. In *Proceedings of International Workshop on Parallel Programming Models and Systems Software for High-End Computing, P2S2 '10*, September 2010. <http://ieeexplore.ieee.org/xpl/articleDetails.jsp?tp=&arnumber=5599103>.
- [70] Eric J. Bohm, Sayantan Chakravorty, Pritish Jetley, **Abhinav Bhatele**, and Laxmikant V. Kale. Ckdirect: Unsynchronized one-sided communication in a message-driven paradigm. In *Proceedings of International Workshop on Parallel Programming Models and Systems Software for High-End Computing, P2S2 '09*. IEEE Computer Society, September 2009. <http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=5365157>.
- [71] **Abhinav Bhatele**, Laxmikant V. Kale, Nicholas Chen, and Ralph E. Johnson. Pattern language for topology aware mapping. In *Proceedings of the Workshop on Parallel Programming Patterns, ParaPLOP '09*, June 2009.
- [72] **Abhinav Bhatele** and Laxmikant V. Kale. An evaluative study on the effect of contention on message latencies in large supercomputers. In *Proceedings of the Workshop on Large-Scale Parallel Processing, LSPP '09*. IEEE Computer Society, April 2009. <http://doi.ieeecomputersociety.org/10.1109/IPDPS.2009.5161094>.
- [73] **Abhinav Bhatele** and Laxmikant V. Kale. Application-specific topology-aware mapping for three dimensional topologies. In *Proceedings of the Workshop on Large-Scale Parallel Processing, LSPP '08*. IEEE Computer Society, April 2008. <http://doi.ieeecomputersociety.org/10.1109/IPDPS.2008.4536348>.
- [74] **Abhinav Bhatele** and Guojing Cong. A selective profiling tool: Towards automatic performance tuning. In *Proceedings of the International Workshop on System Management Techniques, Processes and Services, SMTSPS '07*. IEEE Computer Society, April 2007. <http://doi.ieeecomputersociety.org/10.1109/IPDPS.2007.370627>.

Grants

- 2019 **PI**, *Validation & Hardening of the TraceR HPC Network Simulator*, \$100,000. LLNL Organizational ISCP
- 2018–present **PI**, *Exploring Research Ideas in Machine Learning and Performance Engineering for HPC*, \$63,000. LLNL Early and Mid-Career Recognition Award
- 2017–present **Co-PI***, *ECP Proxy Applications Project*, \$2,000,000/year. PI: David Richards, LLNL. DOE Exascale Computing Project (ECP).
- 2017–present **Co-PI**, *Workload-driven Design Space Exploration*, \$500,000/year. PI: Maya Gokhale, LLNL. DOE ECP Hardware Integration.

- 2011–present **Co-I***, *Performance Analysis and Visualization at Exascale (PAVE)*, \$500,000/year.
PI: Todd Gamblin, LLNL. DOE/NNSA Advanced Simulation and Computing Program.
- 2016 **PI**, *Exploring Asynchronous Task-based Models and Runtimes in WSC Codes*, \$100,000.
Linking Exploratory Application Research to Next-gen development (LEARN) program.
- 2015–2017 **Co-PI**, *Beyond the Standard Model (BSM)*. \$249,000 (*no-cost extension*).
PI: Adolfo Hoisie, PNNL. DOE ASCR
- 2014–2017 **Co-PI**, *Planetary Scale Agent Simulations*, \$2,110,000.
PI: Peter D. Barnes Jr., LLNL. DOE LDRD Exploratory Research.
- 2013–2016 **Co-I***, *Performance Insight for Programs and Exascale Runtimes (PIPER)*, \$4,500,000.
PI: Martin Schulz, LLNL. DOE ASCR X-Stack II Program.
- 2012–2015 **PI**, *Task mapping on complex network topologies for improving performance*, \$945,000.
DOE LDRD Exploratory Research.
- *Co-Investigator (significant contribution to ideas in the project)

Teaching Experience

- Spring 2013 **US Hindi Foundation (USHF), Palo Alto, CA**, *Instructor*, Hindi Level I and II.
- Summer 2009 **Department of Computer Science, Univ. of Illinois**, *Instructor*, Computer Architecture I (CS231)*.
- Summer 2008 **Department of Computer Science, Univ. of Illinois**, *Instructor*, Computer Architecture I (CS231)*.
- Summer 2005 **Indian Institute of Technology, Kanpur**, *Instructor*, Data Structures and Algorithms*.
- * Full responsibility for the course, prepared and gave lectures, awarded final grades

Software Projects

[Software developed by me \(github.com/bhatele\)](https://github.com/bhatele)

- CommProxies MPI proxy codes representing communication patterns in HPC applications
- congest Interconnect CONGestion ESTimators
 - hatchet Python library for analyzing hierarchical performance data
 - mapping Heuristics-based task mapping library
 - mol3d Molecular Dynamics proxy application in Charm++
- NoiseFinder Program to quantify OS Noise on HPC clusters
- topomgr Interconnect Topology Management/Discovery Library
- [Software co-developed with students, postdocs & collaborators \(github.com/LLNL\)](https://github.com/LLNL)
- AriesNCL Aries Network Performance Counters Monitoring Library
 - BGQNCL Blue Gene/Q Network Performance Counters Monitoring Library
 - Boxfish Tool for visualizing traffic on n -dimensional torus networks
 - CallFlow Tool for visualizing calling context trees
 - Chatterbug Suite of communication proxies for HPC applications
 - Chizu Graph partitioning based task mapping library
 - Damselfly Model-based parallel network simulator
 - DragonView Tool for visualizing traffic on dragonfly networks
 - Graphator Serial codes to generate communication patterns for parallel programs
 - Kripke-Charm Charm++ version of Kripke, a 3D Sn deterministic particle transport code
 - Loupe Profiler for MPI programs
 - LULESH-Charm Charm++ version of LULESH, a shock hydrodynamics proxy application
 - Ravel Tool for visualizing parallel execution traces in logical time
 - Rubik Python library for task mapping of structured codes on n -dimensional torus
 - TraceR Trace Replay and network simulation framework
 - TreeScope Tool for visualizing traffic on fat-tree networks

[Other open-source software I have contributed to](#)

Spack	A package manager for HPC platforms
Charm++	Message-passing parallel language and runtime system
NAMD	Classical Molecular Dynamics simulation software in Charm++
OpenAtom	Car-Parrinello Molecular Dynamics simulation software in Charm++

Mentoring/Co-advising

Postdocs	Christopher Earl (LLNL), Giorgis Georgakoudis (LLNL), Tanzima Islam (LLNL), Nikhil Jain (LLNL), Aniruddha Marathe (LLNL), Jae-Seung Yeom (LLNL)
Graduate Students	Bilge Acun (Illinois), Israa Alqassem (Purdue), Ashwin Bhandare (UC Davis), Saptarshi Bhowmik (Florida State), Kevin Brown (Tokyo Tech), Ronak Buch (Illinois), Emilio Castillo (BSC), Vanessa Cedeno (Virginia Tech), Jaemin Choi (Illinois), Mehmet Deveci (Ohio State), Jens Domke (TU Dresden), Venmugil Elango (Ohio State), Alfredo Giménez (UC Davis), Suraj P. Kesavan (UC Davis), Katherine E. Isaacs (UC Davis), Harsh Khetawat (NC State), Konstantinos Koiliaris (Illinois), Harshitha Menon (Illinois), Yin Yee Ng (UC Davis), Huu Tan Nguyen (UC Davis), Samuel Pollard (UOregon), Michael P. Robson (Illinois), Karthik Senthil (Illinois), Aamer Shah (RWTH Aachen), Staci Smith (Arizona), Edgar Solomonik (UC Berkeley), Ankit Srivastava (Georgia Tech), Felix Wang (Illinois), Samuel T. White (Illinois), Chunxing Yin (Georgia Tech)
Undergraduate Students	Matthew R. Kotila (UC Davis), Aditya Nigam (IIT Kanpur), Alexander Robey (Swarthmore), Kristina Sep (UC Berkeley), Palash Sharma (IIT Kanpur), Andrew R. Titus (MIT), Dylan Wang (UC Davis)

Peer Review Committees

Tech. Program Committees	Conferences: ICISTM '12, IEEE BigData (2013, 2014), IEEE Cluster (2015, 2016), Euro-Par '16, HotI '17, SBAC-PAD (2013–2017), SC '18, HiPC (2017, 2018), CCGrid (2012, 2013, 2018, 2019), HotI '19, IPDPS (2014, 2015, 2017, 2019, 2020) Workshops: WHIST '12, ESCAPE (2011–2013), WRAP '15, COMHPC '16, HPCMASPA (2016–2019), PMBS (2017, 2018), SNACS '19
Grant Review Panels	2018 DOE Predictive Science Academic Alliance Program (PSAAP) III 2016–2018 LLNL Institutional Computing Grand Challenge Awards 2014 DOE Small Business Innovation Research (SBIR) 2014 DOE/ASCR Computer Science Research Program
Other Committees	2016 SC'16 Early Career Program Committee 2014 SC'14 Workshops Committee 2012, 2013 Selection Committee, ACM/IEEE-CS George Michael Memorial HPC Fellowship
Technical Reviewer	Conferences: CHI '08, ICPP '09, PPOPP '11, PACT '12, SBAC-PAD '12, Euro-Par '13, ICS '14 (ERC) Journals: IEEE TPDS, ToC, IJHPCA, JPDC, CPE, PARCO, FGCS, IJCS

Professional Service

Member	ACM, ACM SIGHPC, IEEE, IEEE Computer Society, IEEE TCHPC
2019	Workshop Chair, Workshop on Programming and Performance Visualization Tools, Denver, CO
2018, 2019	Co-organizer, Computation Summer Hackathon, LLNL
2019	Workshops and Tutorials Chair, PPOPP'19, Washington, DC
2017, 2018	Mentor for Supercomputing Mentor/Protégé Program
2018	Member, DOE CORAL2 Technical Evaluation Team (TET)
2017–2018	Chair, Tri-lab Support Team (TST), PSAAP-II Center of Excellence, University of Florida
2017, 2018	Workshop Chair, International Workshop on Visual Performance Analytics
2016, 2018	Organizer, Mini-symposium at SIAM PP'16 (Paris, France), SIAM PP'18 (Tokyo, Japan)
2017	Posters Chair, IEEE Cluster Conference, Honolulu, HI
2017	Organizer, Mini-symposium at SIAM CSE'17, Atlanta, GA
2009, 2012, 2014	Mentor for Supercomputing Mentor/Protégé Program
2014	Program Committee Area Chair, Applications and Algorithms Track, SBAC-PAD '14

- 2012 Postdoc Representative, Institutional Postdoc Program Board (IPPB), LLNL
- 2011–2012 Member and Web Developer, Lawrence Livermore Postdoc Association (LLPA) Council
- 2010–2011 Member and Web Developer, Society of Postdoctoral Scholars, Univ. of Illinois
- 2010 CS Grad Ambassador, Dept. of Computer Science, Univ. of Illinois
- 2007–2011 Helped with organization of Charm++ Workshops
- 2009, 2010 Facilitator, Graduate Academy for College Teaching, Univ. of Illinois
- 2009, 2010 Mentor for the WCS Mentoring Program, Dept. of CS, Univ. of Illinois
- 2008, 2009 Student Volunteer, Supercomputing, Austin, TX and Portland, OR

Time Allocation Grants

- 2015–2018 **PI**, *Performance Analysis, Modeling and Scaling of HPC Applications & Tools*, >3M core-hours/year. Edison & Cori (NERSC), Director Reserve Allocation Award
- 2015–2016 **PI**, *Performance Analysis, Modeling and Scaling of HPC Applications & Tools*, 20.1M core-hours at ALCF, 9.3M core-hours at OLCF. Mira & Titan, ASCR Leadership Computing Challenge (ALCC).
- 2012–2015 **PI**, *Scalable Topology Aware Task Embedding (STATE)*, 17M core-hours/year. Cab & Vulcan (LLNL LC), Multiprogrammatic & Institutional Computing Initiative.
- 2014 **PI**, *Modeling Communication Behavior on Supercomputer Networks*, 30K core-hours. Blacklight (PSC), Extreme Science and Engineering Discovery Environment (XSEDE).
- 2013 **PI**, *Exploring energy efficiency, memory contention and application-tools-hardware co-design on a Xeon Phi cluster*, 10K node-hours. Beacon (NICS), The Beacon Project.
- 2008–2011 **Co-PI**, *Charm++ and its applications*, 1M core-hours/year. Intrepid (ANL ALCF), Director's Discretionary Allocation.

Significant Presentations

Technical Posters

- [75] Emilio Castillo, Nikhil Jain, Marc Casas, Miquel Moreto, Martin Schulz, Ramon Beivide, Mateo Valero, and **Abhinav Bhatele**. Optimizing computation-communication overlap in asynchronous task-based programs. In *Proceedings of the ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming*, PPOPP '19, New York, NY, February 2019. ACM. LLNL-POST-767691.
- [76] Rob Ross, Misbah Mubarak, Ray Bair, **Abhinav Bhatele**, Nikhil Jain, Scott Pakin, Chris Carothers, Scott Hemmert, Jeremiah Wilke, Si Hammond, and Mike Levenhagen. Simulation of exascale system interconnects. In *Exascale Computing Project Annual Meeting*, ECP '17, February 2017. LLNL-POST-719979.
- [77] Yarden Livnat, **Abhinav Bhatele**, Nikhil Jain, Peer-Timo Bremer, and Valerio Pascucci. DragonView: Toward understanding network interference in dragonfly-based supercomputers. In *Proceedings of the SCI Institute Technical Exchange*, SCIX '16, November 2016. LLNL-POST-.
- [78] Alfredo Giménez, Todd Gamblin, Peer-Timo Bremer, **Abhinav Bhatele**, and Martin Schulz. Combining disparate data sources in the HPC ecosystem. In *Proceedings of the Salishan Conference on High Speed Computing*, Salishan '16, April 2016. LLNL-POST-692697.
- [79] **Abhinav Bhatele**, Nikhil Jain, Yarden Livnat, Valerio Pascucci, and Peer-Timo Bremer. Simulating and visualizing traffic on the dragonfly network. In *Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis*, SC '15, November 2015. LLNL-POST-676008. http://sc15.supercomputing.org/sites/all/themes/SC15images/tech_poster/tech_poster_pages/post109.html.
- [80] Nikhil Jain, **Abhinav Bhatele**, Jae-Seung Yeom, Mark F. Adams, Francesco Miniati, Chao Mei, and Laxmikant V. Kale. Interoperating MPI and Charm++ for productivity and performance. In *Proceedings of the International Conference for High Performance Computing, Networking, Storage and*

Analysis, SC '14, November 2014. LLNL-POST-662677. http://sc14.supercomputing.org/sites/all/themes/sc14/files/archive/tech_poster/tech_poster_pages/post236.html.

- [81] Andrew Titus and **Abhinav Bhatele**. Supervised learning for parallel application performance prediction. In *Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis*, SC '14, November 2014. LLNL-POST-662676. http://sc14.supercomputing.org/sites/all/themes/sc14/files/archive/src_poster/src_poster_pages/spost127.html.
- [82] Dylan Wang, **Abhinav Bhatele**, and Dipak Ghosal. Performance variability due to job placement on Edison. In *Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis*, SC '14, November 2014. LLNL-POST-662284. http://sc14.supercomputing.org/sites/all/themes/sc14/files/archive/src_poster/src_poster_pages/spost120.html.
- [83] Katherine E. Isaacs, Todd Gamblin, **Abhinav Bhatele**, Peer-Timo Bremer, Martin Schulz, and Bernd Hamann. Extracting logical structure and identifying stragglers in parallel execution traces. In *Proceedings of the 19th ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming*, PPOPP '14, New York, NY, February 2014. ACM. LLNL-POST-649674. <http://doi.acm.org/10.1145/2555243.2555288>.
- [84] **Abhinav Bhatele**, Todd Gamblin, Steven H. Langer, Peer-Timo Bremer, and Martin Schulz. Mapping collectives over sub-communicators on torus networks. In *Current Challenges in Computing 2012: Network Science*, Napa, CA, August 2012. LLNL-POST-563791.
- [85] Aaditya Landge, Joshua A. Levine, Peer-Timo Bremer, Martin Schulz, Todd Gamblin, **Abhinav Bhatele**, Katherine Isaacs, and Valerio Pascucci. Interactive visualizations for performance analysis of heterogeneous computing clusters. In *GPU Technology Conference*, GTC '12, San Jose, CA, May 2012. LLNL-POST-518831.
- [86] **Abhinav Bhatele**, Todd Gamblin, Martin Schulz, and Peer-Timo Bremer. Intuitive visualizations for analyzing exascale workloads. In *Exascale Research Conference*, Portland, OR, April 2012. LLNL-POST-545412.
- [87] **Abhinav Bhatele**, Todd Gamblin, Brian T. N. Gunney, Martin Schulz, Peer-Timo Bremer, and Katherine Isaacs. Revealing performance artifacts in parallel codes through multi-domain visualizations. In *SIAM Conference on Parallel Processing for Scientific Computing*, SIAM PP'12, Savannah, GA, February 2012. LLNL-POST-527971. http://meetings.siam.org/session/dsp_talk.cfm?p=49976.
- [88] **Abhinav Bhatele**, Lukasz Wesolowski, Eric Bohm, Edgar Solomonik, and Laxmikant V. Kalé. Performance comparison of Intrepid, Jaguar and Ranger using scientific applications. In *Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis*, SC '09, November 2009.
- [89] **Abhinav Bhatele**, Eric Bohm, and Laxmikant V. Kalé. Topology aware task mapping techniques: an API and case study. In *Proceedings of the 14th ACM SIGPLAN symposium on Principles and Practice of Parallel Programming*, PPOPP '09. ACM, February 2009. <http://doi.acm.org/10.1145/1504176.1504225>.
- [90] **Abhinav Bhatele** and Laxmikant V. Kalé. Effects of contention on message latencies in large supercomputers. In *Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis*, SC '08, November 2008.
- [91] **Abhinav Bhatele** and Laxmikant V. Kalé. Automatic topology-aware task mapping for parallel applications running on large parallel machines. In *Proceedings of the IEEE International Parallel & Distributed Processing Symposium*, IPDPS '08, April 2008.

Invited Talks

- [92] Samuel A. Pollard, Nikhil Jain, Stephen Herbein, and **Abhinav Bhatele**. Interference-free node allocations on fat-tree clusters. In *ACM/IEEE International Conference for High Performance Computing, Networking, Storage and Analysis*, SC '18, November 2018. LLNL-PRES-761657.
- [93] **Abhinav Bhatele**. Network simulation and performance analysis research at LLNL. In *Technical University Munich*, Munich, Germany, July 2018. LLNL-PRES-756255.
- [94] Jayaraman J. Thiagarajan, Rushil Anirudh, Bhavya Kailkhura, Nikhil Jain, Tanzima Islam, **Abhinav Bhatele**, Jae-Seung Yeom, and Todd Gamblin. PADDLE: Performance analysis using a data-driven learning environment. In *Proceedings of the IEEE International Parallel & Distributed Processing Symposium*, IPDPS '18, Vancouver, Canada, May 2018. LLNL-PRES-751869.
- [95] **Abhinav Bhatele**, Nikhil Jain, Todd Gamblin, and Laxmikant V. Kale. Network design and comparison studies using tracer simulations. In *SIAM Conference on Parallel Processing for Scientific Computing*, SIAM PP'18, Tokyo, Japan, March 2018. LLNL-PRES-742377.
- [96] Takatsugu Ono, Yuta Kakibuka, Koji Inoue, Nikhil Jain, **Abhinav Bhatele**, and Shinobu Miwa. Dynamic power management of hpc networks. In *Fifth DOE/MEXT Meeting*, Tokyo, Japan, March 2018. LLNL-PRES-747751.
- [97] **Abhinav Bhatele**. Analyzing and mitigating congestion on high performance networks. In *CS Colloquium, The University of Arizona*, Tucson, AZ, February 2018. LLNL-PRES-756280.
- [98] **Abhinav Bhatele**. Optimizing performance on hpc systems. In *CS Colloquium, University of Oregon*, Eugene, OR, February 2018. LLNL-PRES-756281. <https://cs.uoregon.edu/colloquium/analyzing-and-mitigating-congestion-high-performance-networks>.
- [99] **Abhinav Bhatele**, Jae-Seung Yeom, Nikhil Jain, Chris J. Kuhlman, Yarden Livnat, Keith R. Bisset, Laxmikant V. Kale, and Madhav V. Marathe. Scaling parallel epidemic simulations using Charm++. In *SC Birds-of-a-feather Session on Charm++ and AMPI*, SC '17 BoF, Denver, CO, November 2017. LLNL-PRES-742360.
- [100] Nikhil Jain, **Abhinav Bhatele**, Louis Howell, David Böhme, Ian Karlin, Edgar Leon, Misbah Mubarak, Noah Wolfe, Todd Gamblin, and Matthew Leininger. Predicting the performance impact of different fat-tree configurations. In *ACM/IEEE International Conference for High Performance Computing, Networking, Storage and Analysis*, SC '17, Denver, CO, November 2017. LLNL-PRES-742377.
- [101] **Abhinav Bhatele**, Jae-Seung Yeom, Nikhil Jain, Chris J. Kuhlman, Yarden Livnat, Keith R. Bisset, Laxmikant V. Kale, and Madhav V. Marathe. Massively parallel simulations of spread of infectious diseases over realistic social networks. In *NERSC Users Group meeting*, NUG '17, Berkeley, CA, September 2017. LLNL-PRES-731838.
- [102] **Abhinav Bhatele**, Jae-Seung Yeom, Nikhil Jain, Chris J. Kuhlman, Yarden Livnat, Keith R. Bisset, Laxmikant V. Kale, and Madhav V. Marathe. Massively parallel simulations of spread of infectious diseases over realistic social networks. In *CCGrid '17 SCALE Challenge*, Madrid, Spain, May 2017. LLNL-PRES-731838.
- [103] **Abhinav Bhatele**, Staci Smith, David K. Lowenthal, Jayaraman J. Thiagarajan, and Laxmikant V. Kale. Identifying root causes of application performance variability & anomalies. In *SIAM Conference on Computational Science & Engineering*, SIAM CSE'17, Atlanta, GA, March 2017. LLNL-PRES-725619. http://meetings.siam.org/sess/dsp_talk.cfm?p=82513.
- [104] **Abhinav Bhatele**. Early results on exploring Charm++/ Adaptive MPI (AMPI) in WSC codes. In *JOWOG-34 Annual Computer Science Meeting*, Livermore, CA, February 2017. LLNL-PRES-721763.
- [105] **Abhinav Bhatele**. Impact of job placement and routing policies on application performance. In *11th Scheduling for Large Scale Systems Workshop*, Nashville, TN, May 2016. LLNL-PRES-692619.
- [106] **Abhinav Bhatele**. Network simulation and visualization tools: Tracer, Dragonview. In *JOWOG-34 Annual Computer Science Meeting*, Los Alamos, NM, February 2016. LLNL-PRES-675498.

- [107] **Abhinav Bhatele**. Analyzing and optimizing data movement on HPC networks. In *Workshop on Exascale Software Technologies*, Albuquerque, NM, January 2016. LLNL-PRES-681760.
- [108] **Abhinav Bhatele**. Analyzing HPC interconnects using network simulators. In *Network Dynamics and Simulation Science Laboratory (NDSSL), Virginia Tech*, Blacksburg, VA, November 2015. LLNL-PRES-679783.
- [109] **Abhinav Bhatele**. Network simulations to predict congestion and performance. In *JOWOG-34 Annual Meeting*, Livermore, CA, July 2015. LLNL-PRES-675498.
- [110] **Abhinav Bhatele**. Parallel execution models, performance prediction, and optimization. In *Indian Institute of Technology, Kanpur*, Kanpur, INDIA, May 2015. LLNL-PRES-665882.
- [111] **Abhinav Bhatele**, Andrew R. Titus, Jayaraman J. Thiagarajan, Nikhil Jain, Todd Gamblin, Peer-Timo Bremer, Martin Schulz, and Laxmikant V. Kale. Identifying the culprits behind network congestion. In *13th Annual Workshop on Charm++ and its Applications*, Charm++ Workshop '15, Urbana, IL, May 2015. LLNL-PRES-670743. <http://charm.cs.illinois.edu/workshops/charmWorkshop2015/program.php>.
- [112] **Abhinav Bhatele**, Nikhil Jain, Xiang Ni, and Laxmikant V. Kale. Maximizing throughput on a dragonfly network. In *SIAM Conference on Computational Science & Engineering*, SIAM CSE'15, Salt Lake City, UT, March 2015. LLNL-PRES-668919. http://meetings.siam.org/session/dsp_talk.cfm?p=66707.
- [113] **Abhinav Bhatele**. Introduction to Git (Part I). In *Software Improvement Networking Group (SWING) Git Tutorial Series*, Livermore, CA, January 2015. LLNL-PRES-645972.
- [114] **Abhinav Bhatele**. Parallel execution models, performance prediction, and optimization. In *Indian Institute of Technology, Delhi*, Delhi, INDIA, December 2014. LLNL-PRES-665882.
- [115] **Abhinav Bhatele**. Tools for visualizing communication, network traffic, and job placement. In *8th Annual Petascale Tools Workshop*, Madison, WI, August 2014. LLNL-PRES-659275. http://www.paradyn.org/petascale2014/monday_paradyn.html.
- [116] **Abhinav Bhatele**. Task mapping, job placements, and routing strategies. In *12th Annual Workshop on Charm++ and its Applications*, Charm++ Workshop '14, Urbana, IL, April 2014. LLNL-PRES-654602. <http://charm.cs.illinois.edu/workshops/charmWorkshop2014/program.php>.
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