

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

University of Maryland, College Park.

- 2020–present Applied Math. & Statistics, and Scientific Computation (AMSC), *Affiliate Faculty Member (Full).*
- 2019–present Department of Computer Science and Institute for Advanced Computer Studies, *Assistant Professor.*

Lawrence Livermore National Laboratory.

- 2018–2019 Center for Applied Scientific Computing, *Principal Computer Scientist.*
- 2012–2018 Center for Applied Scientific Computing, *Senior Computer Scientist.*
- 2011–2012 Center for Applied Scientific Computing, *Post-doctoral Research Scholar.*

University of Illinois at Urbana-Champaign.

- 2010–2011 Department of Computer Science, *Post-doctoral Research Associate.*
- 2005–2010 Department of Computer Science, *Graduate Research Assistant.*

IBM Thomas J. Watson Research Center.

- Summer 2007 Research Intern.
- Summer 2006 Research Intern.

Awards and Honors

- 2021 **NSF CAREER Award**
- 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 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

Invitation-only Meetings and Conferences

- April 2021 Salishan Conference on High Speed Computing (virtual)
- July 2018 GI-Dagstuhl Seminar on Visualizing Systems and Software Performance (VSSP), Wadern, Germany
- January 2014 Dagstuhl Perspectives Workshop on “Connecting Performance Analysis and Visualization to Advance Extreme Scale Computing”, Wadern, Germany
- September 2013 1st Heidelberg Laureate Forum, Heidelberg, Germany

Grants

- 2021–present **PI**, *CAREER: Self-tuning Parallel Software and Systems*, \$550,000. NSF
- 2020–present **PI**, *Analyzing and Optimizing I/O and Overall Performance of HPC Applications*, \$264,000. DOE/LLNL
- 2020–present **Co-I***, *Collaborative Research: Expeditions: Global Pervasive Computational Epidemiology*, \$XXX,000. PI: Madhav Marathe, Univ. of Virginia. NSF
- 2020 **PI**, *Studying the Impact of Network Traffic Classes Using Simulations*, \$53,000. DOE/LLNL
- 2019 **PI**, *Validation & Hardening of the TraceR HPC Network Simulator*, \$100,000. LLNL Organizational ISCP
- 2018–2019 **PI**, *Exploring Research Ideas in Machine Learning and Performance Engineering for HPC*, \$63,000. LLNL Early and Mid-Career Recognition Award
- 2017–2019 **Co-I***, *ECP Proxy Applications Project*, \$2,000,000/year. PI: David Richards, LLNL. DOE Exascale Computing Project (ECP).
- 2017–2019 **Co-PI**, *Workload-driven Design Space Exploration*, \$500,000/year. PI: Maya Gokhale, LLNL. DOE ECP Hardware Integration.
- 2011–2019 **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-I** = Co-Investigator/Senior Personnel (significant contribution to ideas in the project)

Time Allocation Grants

- 2015–2021 **PI**, *Performance Analysis, Modeling and Scaling of HPC Applications & Tools*, >3M core-hours/year. Edison & Cori (NERSC), Director Reserve Allocation Award
- 2020 **PI**, *Performance Analysis and Tuning of HPC and AI Applications*, 13K node-hours.
PI, *Analyzing and Optimizing Parallel I/O and Performance Tools*, 8K node-hours.
 Summit (OLCF), Director’s Discretion Project 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.

Software Projects

Software developed by me (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)

- 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
- Damselyfly 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++

Teaching Experience

University of Maryland, College Park.

CMSC416 Introduction to Parallel Computing, *Fall 2020, Fall 2021.*

CMSC714 High Performance Computing Systems, *Fall 2019, Spring 2021.*

DIT Workshop HPC Programming Bootcamp, *Winter 2020.*

Spring 2013 **US Hindi Foundation (USHF), Palo Alto, CA**, Hindi Level I and II.

Summer 2009 **University of Illinois**, Computer Architecture I (CS231)*.

Summer 2008 **University of Illinois**, Computer Architecture I (CS231)*.

Summer 2005 **Indian Institute of Technology, Kanpur**, Data Structures and Algorithms*.

* Full responsibility for the course, prepared and gave lectures, awarded final grades

Advising at UMD

Ph.D. Students Onur Cankur, Joshua Davis, Joy Kitson, Benjie Miao, Daniel Nichols, Siddharth Singh, Yiheng Xu

Undergraduate Students Ian Costello, Dilan Gunawardana, Shu-Huai Lin, Sameer Mustaqali, Rohan Mishra, Domenic Sangiovanni, Omer Sharif, Jeff Zhang

High School Students Nikhil Kakani, Aditya Ranjan

Mentoring/Co-advising at LLNL

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)

University and other Academic Service

Dissertation Committee Saptarshi Bhowmik (FSU), Jaemin Choi (Illinois), Tom Cornebize (Univ. of Grenoble), Victoria Cepeda Espinoza (UMD), Swati Singhal (UMD), Staci Smith (Arizona), Candace Walden (UMD)

2021-date UMD DIT Research Technology Working Group

2020-date UMIACS Appointment, Promotion, and Tenure (APT) Committee

2020-date UMIACS Student Seating Committee

2020-date CS Field Committee Chair, Computer Systems

2020-date D&I representative, CS Faculty Search Committee

2020-date CS Diversity and Inclusion Committee

2019-date CS Education Committee

2019-date Iribe Building Committee

Professional Service

2022 General Chair, IEEE Cluster, Heidelberg, Germany

2021 Program Vice-Chair, Applications Track, HiPC '21

- 2021 Virtual Logistics Liaison for BOFs, SC '21
- 2021 Program Committee Track Chair, Performance Track, ICPP '21
- 2021 Deputy PhD Forum Chair, ISC, Frankfurt, Germany
- 2019–2021 Workshop Co-Chair, Workshop on Programming and Performance Visualization Tools (ProTools)
- Member ACM, ACM SIGHPC, IEEE, IEEE Computer Society, IEEE TCHPC
- 2018, 2019 Co-organizer, Computation Summer Hackathon, LLNL
- 2019 Workshops and Tutorials Chair, PPOPP'19, Washington, DC
- 2017, 2018, 2019 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

Peer Review Committees

- Editorial Board** Associate Editor, IEEE Transactions on Parallel and Distributed Systems, 2021–present
- Tech. Program Committees** Conferences: ICISTM '12, IEEE BigData (2013, 2014), IEEE Cluster (2015, 2016), Euro-Par '16, HotI '17, SBAC-PAD (2013–2017), HotI '19, CCGrid (2012, 2013, 2018–2020), ISC '20, HiPC (2017, 2018, 2020), VISSOFT (2020, 2021), IPDPS (2014, 2015, 2017, 2019–2021), SC (2018, 2021)
Workshops: WHIST '12, ESCAPE (2011–2013), WRAP '15, COMHPC '16, HPCMASPA (2016–2019), PMBS (2017, 2018), SNACS (2019, 2021)
- Grant Review Panels** 2020 NSF Review Panel
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** 2021 SC'21 Tutorials Committee
2020 CCGrid '20 Scalable Computing Challenge (SCALE) Committee
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, IHPCA, JPDC, CPE, PARCO, FGCS, IJCS, JOSS

Peer Reviewed Publications

Journal Publications

- [1] Huu Tan Nguyen, **Abhinav Bhatele**, Nikhil Jain, Suraj Kesavan, Harsh Bhatia, Todd Gamblin, Kwan-Liu Ma, and Peer-Timo Bremer. Visualizing hierarchical performance profiles of parallel codes using callflow. *IEEE Transactions on Visualization and Computer Graphics*, November 2019. LLNL-JRNL-797378. <https://doi.ieeecomputersociety.org/10.1109/TVCG.2019.2953746>.
- [2] 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>.
- [3] 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>.
- [4] 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>.
- [5] 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>.
- [6] 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>.
- [7] 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>.
- [8] 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>.
- [9] 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>.
- [10] **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>.
- [11] **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>.
- [12] **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>.

- [13] **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>.
- [14] 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>.
- [15] 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

- [16] Sascha Hunold, **Abhinav Bhatele**, George Bosilca, and Peter Knees. Predicting MPI collective communication performance using machine learning. In *Proceedings of the IEEE Cluster Conference*, Cluster '20, September 2020. <https://doi.ieeecomputersociety.org/10.1109/CLUSTER49012.2020.00036>.
- [17] Jaemin Choi, David Richards, Laxmikant V. Kale, and **Abhinav Bhatele**. End-to-end performance modeling of distributed GPU applications. In *Proceedings of the International Conference on Supercomputing*, ICS '20, June 2020. LLNL-CONF-809401. <http://doi.acm.org/10.1145/3392717.3392737>.
- [18] **Abhinav Bhatele**, Jayaraman J. Thiagarajan, Taylor Groves, Rushil Anirudh, Staci A. Smith, Brandon Cook, and David K. Lowenthal. The case of performance variability on dragonfly-based systems. In *Proceedings of the IEEE International Parallel & Distributed Processing Symposium*, IPDPS '20. IEEE Computer Society, May 2020. LLNL-CONF-772401. <https://doi.ieeecomputersociety.org/10.1109/IPDPS47924.2020.00096>.
- [19] Harshitha Menon, **Abhinav Bhatele**, and Todd Gamblin. Auto-tuning parameter choices using bayesian optimization. In *Proceedings of the IEEE International Parallel & Distributed Processing Symposium*, IPDPS '20. IEEE Computer Society, May 2020. LLNL-CONF-772119. <https://doi.ieeecomputersociety.org/10.1109/IPDPS47924.2020.00090>.
- [20] Giorgis Georgakoudis, Nikhil Jain, Takatsugu Ono, Koji Inoue, Shinobu Miwa, and **Abhinav Bhatele**. Evaluating the impact of energy efficient networks on hpc workloads. In *Proceedings of the IEEE International Conference on High Performance Computing*, HiPC '19, December 2019. LLNL-CONF-791976. <https://doi.ieeecomputersociety.org/10.1109/HiPC.2019.00044>.
- [21] **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. LLNL-CONF-772402. <http://doi.acm.org/10.1145/3295500.3356219>.
- [22] **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. <http://doi.acm.org/10.1145/3316480.3325516>.
- [23] 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. <http://doi.acm.org/10.1145/3293883.3295720>.
- [24] 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. <https://doi.ieeecomputersociety.org/10.1109/SC.2018.00029>.
- [25] 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. <https://doi.ieeecomputersociety.org/10.1109/SC.2018.00030>.
- [26] 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>.
- [27] 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>.
- [28] 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>.
- [29] 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>.
- [30] 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>.
- [31] 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>.
- [32] 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>.
- [33] 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>.
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- [122] **Abhinav Bhatele**. Analyzing call graphs using hatchet. In *18th Annual Workshop on Charm++ and its Applications*, Charm++ Workshop '20, virtual, October 2020.  <https://charm.cs.illinois.edu/workshops/charmWorkshop2020/program.shtml>.
- [123] **Abhinav Bhatele**. Modeling performance variability via machine learning. In *Workshop on Modeling & Simulation of Systems and Applications*, ModSim '20, virtual, July 2020.  <https://www.bnl.gov/modsim2020/files/pdf/agenda.pdf>.
- [124] **Abhinav Bhatele**. On mitigating congestion in high performance networks. In *Technical University Munich/LRZ*, Munich, Germany, July 2019.  <https://www.ias.tum.de/en/events/events-single-view/article/on-mitigating-congestion-in-high-performance-networks-talk-bei-tum-ias-visiting-fellow-pr>

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- [126] **Abhinav Bhatele**, Stephanie Brink, and Todd Gamblin. Hatchet: Pruning the overgrowth in parallel profiles. In *Scalable Tools Workshop*, Lake Tahoe, CA, July 2019. https://dyninst.github.io/scalable_tools_workshop/petascale2019/monday.html.
- [127] **Abhinav Bhatele**. The case of performance variability on dragonfly networks. In *Tokyo Institute of Technology*, Tokyo, Japan, May 2019.
- [128] **Abhinav Bhatele**. Understanding and optimizing performance on hpc networks. In *RIKEN Center for Computational Science (CCS)*, Kobe, Japan, May 2019.
- [129] **Abhinav Bhatele**. On mitigating congestion in high performance networks. In *CS Colloquium, Rice University*, Houston, TX, February 2019. LLNL-PRES-767646.
- [130] **Abhinav Bhatele**. On mitigating congestion in high performance networks. In *CS Colloquium, University of Maryland*, College Park, MD, February 2019. LLNL-PRES-767646. <https://www.cs.umd.edu/event/2019/01/mitigating-congestion-high-performance-networks>.
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- [133] 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.
- [134] **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.
- [135] 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.
- [136] **Abhinav Bhatele**. Analyzing and mitigating congestion on high performance networks. In *CS Colloquium, The University of Arizona*, Tucson, AZ, February 2018. LLNL-PRES-756280.
- [137] **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>.
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- [140] **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.

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- [145] **Abhinav Bhatele**. Network simulation and visualization tools: Tracer, Dragonview. In *JOWOG-34 Annual Computer Science Meeting*, Los Alamos, NM, February 2016. LLNL-PRES-675498.
- [146] **Abhinav Bhatele**. Analyzing and optimizing data movement on HPC networks. In *Workshop on Exascale Software Technologies*, Albuquerque, NM, January 2016. LLNL-PRES-681760.
- [147] **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.
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- [149] **Abhinav Bhatele**. Parallel execution models, performance prediction, and optimization. In *Indian Institute of Technology, Kanpur*, Kanpur, INDIA, May 2015. LLNL-PRES-665882.
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- [154] **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.
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