

Harshitha Menon

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Education

- 2016 **Ph.D., Computer Science**, *University of Illinois at Urbana-Champaign*.
Adaptive Load Balancing for HPC Applications. Advisor: Laxmikant V. Kale
- 2012 **M.S., Computer Science and Engineering**, *University of Illinois at Urbana-Champaign*.
- 2006 **B.Tech., Computer Science and Engineering**, *College of Engineering*, Trivandrum, India.

Research and Work Experience

- 2016-present **Lawrence Livermore National Laboratory**, *Computer Scientist (from 10/18), Postdoctoral Research Staff (till 10/18)*.
- 2012-2016 **Dept of Computer Science, University of Illinois at Urbana-Champaign**, *Research Assistant*.
- Summer 2015 **Charmworks**, *Advanced Software Developer Intern*.
- Summer 2013 **Lawrence Livermore National Laboratory**, *Research Intern*.
- 2010-2011 **Dept of Computer Science, University of Illinois at Urbana-Champaign**, *Teaching Assistant*.
- Summer 2011 **Google**, *Summer Intern*.
- 2006-2010 **Google**, *Software Engineer*.

Awards & Honors

- 2021 Best Reproducibility Award, Supercomputing (SC)'21
- 2018 Research Slam Finalist, LLNL
- 2017 Best Poster Award Finalist, Supercomputing (SC) '17
- 2016 Featured article in IEEE Computer magazine October issue
- 2016 Invited to Women in Research Lean In event for top PhD female students, Facebook
- 2014 ACM/IEEE-CS George Michael Memorial HPC Fellowship, SC '14
- 2014 Google Anita Borg Memorial Scholarship
- 2014 Best Paper Award, IEEE Cluster '14
- 2014 Feng Chen Memorial Best Paper Award, University of Illinois at Urbana Champaign
- 2013 Best Student Paper Award Finalist, Supercomputing (SC) '13
- 2013 Best Poster Award, Student Poster Symposium, LLNL
- 2012 Siebel Scholarship
- 2012 Member of finalist team for HPC Challenge Class II Award, Supercomputing (SC) '12
- 2011 Teachers Ranked as Excellent, University of Illinois at Urbana Champaign, Fall 2011
- 2010 Google Fellowship for Employees
- 2007 Google Founders Award for contributions to Gmail

Research and Other Funding

- 2020-present **Co-I**, *BUILD: Binary Understanding and Integration Logic for Dependencies*, \$2.1M/year.
PI: Todd Gamblin, LLNL. DOE LDRD Strategic Initiative.
- 2019-present **PI**, *Approximate High Performance Computing : A Fast and Energy Efficient Computing Paradigm in the Post-Moore Era*, LLNL. DOE LDRD Exploratory Research, \$700K/year.
- 2019-2021 **Co-PI**, *Validating Extreme-scale Resilience with Veracity*, LLNL. DOE Advanced Scientific Computing Research (ASCR), \$90K.

2018 **PI**, *Multi-scale Fault Injector with DisCVar and FSEFI*, Linking Exploratory Application Research to Next-gen development (LEARN) program, \$112K.

Mentoring/Co-advising

Postdocs Konstantinos Parasyris (LLNL), James Diffenderfer (LLNL)
Graduate Students Zhimin Li (Univ. Utah), Jackson Vanover (UC Davis), Diego Jimenez Vargas (CENAT), Nathan Pinnow (WWU)
Undergraduate Students Logan Moody (JMU), Garrett Folks (JMU)

Professional Service

Workshop Chair IEEE Cluster, Heidelberg, Germany
Organizer Mini-symposium at SIAM CSE'21

Committees

Board Member Institutional Postdoc Program Board, LLNL
Technical Review Board IEEE Transactions on Parallel and Distributed Systems, 2020-2021
Technical Program Committees HPDC'22, IPDPS'22, ICPP'21, HIPC'21, Cluster'20, ICPP'20, CARLA'19, PASC'19, Euro-Par'19, PPOPP '19, ICPP '18, Euro MPI '18
Other Committees SC'21 Workshop Committee, SC'20 Research Posters Committee
Other Reviewing TPDS, TACO, IJHPCA, Concurrency and Computation: Practice and Experience, PMBS, FGCS

Invited Talks

Dec 13, 2021 **NeurIPS Differentiable Programming Workshop 2021**,
Approximate High Performance Computing Guided by Automatic Differentiation, Virtual.
Held at NeurIPS'21
April 3, 2019 **James Madison University CS Speaker Series**,
Error Analysis in Applications Using Algorithmic Differentiation, Harrisonburg, Virginia.
May 5, 2021 **LANS seminar series**,
Approximate High Performance Computing : A Fast and Energy Efficient Computing Paradigm in the Post-Moore Era, Argonne National Laboratory.
Aug 11, 2020 **23rd European Workshop on Automatic Differentiation**,
Error Analysis Using Automatic Differentiation in HPC Applications, Virtual.
May 8, 2020 **ICERM workshop on Variable Precision in Mathematical and Scientific Computing**,
Automatic Mixed Precision Analysis and Transformation Tool, Virtual.

Publications

Peer Reviewed Conference & Journal Papers

- [1] Harshitha Menon*, Konstantinos Parasyris*, Tom Scogland, and Todd Gamblin. Reliabuild: Searching for high-fidelity builds using active learning. *Mining Software Repositories*, 2022.
- [2] James Diffenderfer, Daniel Osei-Kuffuor, and **Harshitha Menon**. Qdot: Quantized dot product kernel for approximate high-performance computing. *SIAM Journal on Scientific Computing (SISC)*, 2021.
- [3] Zhimin Li, **Harshitha Menon**, Kathryn Mohror, Peer-Timo Bremer, Yarden Livant, and Valerio Pascucci. Understanding a program's resiliency through error propagation. In *Proceedings of the 26th ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming (PPoPP)*, pages 362–373, 2021.
- [4] Konstantinos Parasyris, Giorgis Georgakoudis, **Harshitha Menon**, James Diffenderfer, Ignacio Laguna, Daniel Osei-Kuffuor, and Markus Schordan. Hpac: Evaluating approximate computing techniques on hpc openmp applications. In *Proceedings of the International Conference for High Performance Computing*,

Networking, Storage and Analysis, SC '21, New York, NY, USA, 2021. Association for Computing Machinery.

- [5] Zhimin Li, **Harshitha Menon**, Dan Maljovec, Yarden Livnat, Shusen Liu, Kathryn Mohror, Peer-Timo Bremer, and Valerio Pascucci. Spotsdc: Revealing the silent data corruption propagation in high-performance computing systems. *IEEE Transactions on Visualization and Computer Graphics (TVCG)*, 27(10):3938–3952, 2020.
- [6] **Harshitha Menon**, Abhinav Bhatele, and Todd Gamblin. Auto-tuning parameter choices in hpc applications using bayesian optimization. In *2020 IEEE International Parallel and Distributed Processing Symposium (IPDPS)*, pages 831–840. IEEE, 2020.
- [7] Konstantinos Parasyris, Ignacio Laguna, **Harshitha Menon**, Markus Schordan, Daniel Osei-Kuffuor, Giorgis Georgakoudis, Michael O Lam, and Tristan Vanderbruggen. Hpc-mixpbench: An hpc benchmark suite for mixed-precision analysis. In *2020 IEEE International Symposium on Workload Characterization (IISWC)*, pages 25–36. IEEE, 2020.
- [8] **Harshitha Menon**, Michael O. Lam, Daniel Osei-Kuffuor, Markus Schordan, Scott Lloyd, Kathryn Mohror, and Jeffrey Hittinger. Adapt: Algorithmic differentiation applied to floating-point precision tuning. In *Proceedings of the International Conference for High Performance Computing, Networking, Storage, and Analysis*, SC '18. IEEE Press, 2018.
- [9] **Harshitha Menon** and Kathryn Mohror. Discvar: Discovering critical variables using algorithmic differentiation for transient faults. In *Proceedings of the 23rd ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming (PPoPP)*, pages 195–206. ACM, 2018.
- [10] S. Bak, H. Menon, S. White, M. Diener, and L. Kale. Multi-level load balancing with an integrated runtime approach. In *2018 18th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (CCGRID)*, pages 31–40, May 2018.
- [11] Bilge Acun, Akhil Langer, Esteban Meneses, **Harshitha Menon**, Osman Sarood, Ehsan Totoni, and Laxmikant V. Kalé. Power, reliability, and performance: One system to rule them all. *IEEE Computer, Energy Efficient Computing Special Issue*, 49(10):30–37, Oct 2016.
- [12] A Bastidas Fry, F Governato, A Pontzen, T Quinn, M Tremmel, L Anderson, H Menon, AM Brooks, and J Wadsley. All about baryons: revisiting sidm predictions at small halo masses. *Monthly Notices of the Royal Astronomical Society*, 452(2):1468–1479, 2015.
- [13] **Harshitha Menon**, Lukasz Wesolowski, Gengbin Zheng, Pritish Jetley, Laxmikant Kale, Thomas Quinn, and Fabio Governato. Adaptive techniques for clustered n-body cosmological simulations. *Computational Astrophysics and Cosmology*, 2(1):1, 2015.
- [14] Bilge Acun, Abhishek Gupta, Nikhil Jain, Akhil Langer, **Harshitha Menon**, Eric Mikida, Xiang Ni, Michael Robson, Yanhua Sun, Ehsan Totoni, et al. Parallel programming with migratable objects: Charm++ in practice. In *Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis (SC)*, pages 647–658. IEEE Press, 2014.
- Best Paper** [15] Jonathan Lifflander, Esteban Meneses, **Harshitha Menon**, Phil Miller, Sriram Krishnamoorthy, and Laxmikant V Kalé. Scalable replay with partial-order dependencies for message-logging fault tolerance. In *2014 IEEE International Conference On Cluster Computing (CLUSTER)*, pages 19–28. IEEE, 2014. **Best Paper Award**.
- [16] **Harshitha Menon**, Bilge Acun, Simon Garcia De Gonzalo, Osman Sarood, and Laxmikant Kalé. Thermal aware automated load balancing for hpc applications. In *Cluster Computing (CLUSTER), 2013 IEEE International Conference on*, pages 1–8. IEEE, 2013.
- BP Finalist** [17] **Harshitha Menon** and Laxmikant Kalé. A distributed dynamic load balancer for iterative applications. In *Proceedings of the International Conference on High Performance Computing, Networking, Storage and Analysis (SC)*, page 15. ACM, 2013. **Best Student Paper Award Finalist**.
- [18] **Harshitha Menon**, Nikhil Jain, Gengbin Zheng, and Laxmikant Kale. Automated load balancing invocation based on application characteristics. In *Cluster Computing (CLUSTER), 2012 IEEE International Conference on*, pages 373–381. IEEE, 2012.

Workshop Papers & Technical Reports

- [19] **Harshitha Menon**, Konstantinos Parasyris, Tom Scogland, and Todd Gamblin. Reliabuild: Searching for high-fidelity builds using active learning, 2022.
- [20] JA Hittinger, PG Lindstrom, H Bhatia, PT Bremer, DM Copeland, KK Chand, AL Fox, GS Lloyd, H Menon, GD Morrison, et al. Variable precision computing. Technical report, Lawrence Livermore National Lab.(LLNL), Livermore, CA (United States), 2019.

- [21] Michael O Lam, Tristan Vanderbruggen, **Harshitha Menon**, and Markus Schordan. Tool integration for source-level mixed precision. In *2019 IEEE/ACM 3rd International Workshop on Software Correctness for HPC Applications (Correctness)*, pages 27–35. IEEE, 2019.
- [22] **Harshitha Menon**, Chun-Kai Chang, Kathryn Mohror, and Mattan Erez. Identifying critical variables using algorithmic differentiation for a realistic fault model. In *Silicon Errors in Logic System Effects (SELSE)*, 2018.
- [23] Seonmyeong Bak, **Harshitha Menon**, Sam White, Matthias Diener, and Laxmikant Kale. Integrating openmp into the charm++ programming model. In *Proceedings of the Third International Workshop on Extreme Scale Programming Models and Middleware at SC*, page 4. ACM, 2017.
- [24] Markus Schordan, Jan Hückelheim, Pei-Hung Lin, and **Harshitha Menon**. Verifying the floating-point computation equivalence of manually and automatically differentiated code. In *Proceedings of the First International Workshop on Software Correctness for HPC Applications at SC*, pages 34–41. ACM, 2017.
- [25] **Harshitha Menon**, Abhinav Bhatele, Sebastien Fourestier, Laxmikant Kale, and Francois Pellegrini. Applying graph partitioning methods in measurement-based dynamic load balancing. Technical report, 2015.

Ph.D. Dissertation

- [26] **Harshitha Menon**. *Adaptive load balancing for HPC applications*. PhD thesis, University of Illinois at Urbana-Champaign, Urbana, Illinois, October 2016.