Katherine E. Isaacs
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Education

2015 Ph.D., Computer Science, University of California, Davis, Davis, CA USA
2011 B.S., Computer Science, San José State University, San José, CA USA
B.A., Mathematics, San José State University, San José, CA USA
2001 B.S., Physics, California Institute of Technology, Pasadena, CA USA

Honors and Awards

2012 – 2015 US Department of Energy Office of Science Graduate Fellowship (DOE SCGF)
2015 Google Anita Borg Memorial Scholarship
2014 Facebook Grace Hopper Scholarship
2012 National Science Foundation Graduate Research Fellowship (NSF GRFP)
Declined for DOE SCGF
2011 – 2012 Graduate Scholars Fellowship, University of California, Davis
2011 Hoggatt Award for Outstanding Research Potential, San José State University, Department of Mathematics
2011 Outstanding Graduating Senior, San José State University, Department of Computer Science
2009 Frederick N. Fitting Scholarship, San José State University, College of Science
2009 Department Scholarship, San José State University, Department of Computer Science

Research Funding

2019 - 2024 PI, NSF IIS-1844573: CAREER: Comprehensive Techniques and Design for Flexible Graph Visualization of Software and Systems, $527,898.
2018 - 2019 PI, Phylanx Engine Enhancement and Visualization Development, $184,565
Department of Defense
2018 - 2019 PI, CFGExplorer Focus on Visualizing Compiler Optimization, $70,295.
Lawrence Livermore National Laboratory
2017 - 2019 PI, NSF III-1656958: CRII:III:Scalable & Interactive Dependency Visualization to Accelerate Parallel Program Analysis, $174.518.
National Science Foundation
2018 Co-PI, Bringing Science Up To Par Through Dynamic Binary Analysis and Parallelization, $99,158.
University of Arizona VPR, PI: Michelle Strout

Journal Publications

[1] K. E. Isaacs and T. Gamblin. Preserving command line workflow for a package management system using ASCII DAG visualization. *To appear in IEEE Transactions onf Visualization and Computer Graphics*

[2] S. Cheng, W. Zhong, K. Isaacs, and K. Mueller. Visualizing the topology and data traffic of multi-dimensional torus interconnect networks. *IEEE Access*, Sept. 2018

[3] S. Devkota and K. E. Isaacs. CFGExplorer: Designing a visual control flow analytics system around basic program analysis operations. *To appear in Computer Graphics Forum (Proceedings of EuroVis 2018)*, 2018

[4] K. E. Isaacs, T. Gamblin, A. Bhatele, M. Schulz, B. Hamann, and P.-T. Bremer. Ordering traces logically to identify lateness in message passing programs. *IEEE Transactions on Parallel and Distributed Systems*, 27(3):829–840, 2016

[5] K. E. Isaacs, P.-T. Bremer, I. Jusufi, T. Gamblin, A. Bhatele, M. Schulz, and B. Hamann. Combing the communication hairball: Visualizing large-scale parallel execution traces using logical time. *IEEE Transactions on Visualization and Computer Graphics, Proceedings of InfoVis '14*, 20(12):2349–2358, 2014

[6] E. A. Dinsdale, R. A. Edwards, B. A. Bailey, I. Tuba, S. Akhter, K. McNair, R. Schmieder, N. Apkarian, M. Creek, E. Guan, M. Hernandez, K. Isaacs, C. Peterson, T. Regh, and V. Ponomarenko. Multivariate analysis of functional metagenomes. *Frontiers in Genetics*, 4(41), 2013

[7] A. G. Landge, J. A. Levine, K. E. Isaacs, A. Bhatele, T. Gamblin, M. Schulz, S. H. Langer, P.-T. Bremer, and V. Pascucci. Visualizing network traffic to understand the performance of massively parallel simulations. *IEEE Transactions on Visualization and Computer Graphics, Proceedings of InfoVis '12*, 18(12):2467–2476, 2012

Conference and Workshop Publications

[1] R. Tohid, B. Wagle, S. Shirzad, P. Diehl, A. Serio, A. Kheirkhahan, P. Amini, K. Williams, K. Isaacs, K. Huck, S. Brandt, and H. Kaiser. Asynchronous execution of python code on task based runtime systems. In *Proceedings of the Fourth International IEEE Workshop on Extreme Scale Programming Models and Middleware*, Nov. 2018

[2] H. C. Purchase, K. E. Isaacs, T. Bueti, B. Hastings, A. Kassan, A. Kim, and S. van Hoesen. A classification of infographics. In *To appear in the Proceedings of Diagrams 2018*, June 2018

[3] M. M. Strout, S. Debray, K. E. Isaacs, B. Kreaseck, J. Cárdenas-Rodríguez, B. Hurwitz, K. Volk, S. Badger, J. Bartels, I. Bertolacci, S. Devkota, A. Encinas, B. Gaska, B. Neth, T. Sackos, J. Stephens, S. Willer, and B. Yadergari. Language-agnostic optimization and parallelization for interpreted languages. In *Proceedings of the 30th Workshop on Languages and Compilers for Parallel Computing (LCPC)*, October 2017

[4] K. E. Isaacs, A. Bhatele, J. Lifflander, D. Böhme, T. Gamblin, M. Schulz, B. Hamann, and P.-T. Bremer. Recovering logical structure from Charm++ traces. In *Proceedings of the ACM/IEEE Conference on Supercomputing (SC15)*, SC '15, Nov. 2015

[5] A. Bhatele, N. Jain, K. E. Isaacs, R. Buch, T. Gamblin, S. H. Langer, and L. V. Kale. Optimizing the performance of parallel applications on a 5D torus via task mapping. In *Proceedings of IEEE International Conference on High Performance Computing*, HiPC '14, Dec. 2014

[6] C. M. McCarthy, K. E. Isaacs, A. Bhatele, P.-T. Bremer, and B. Hamann. Visualizing the five-dimensional torus network of the IBM Blue Gene/Q. In *Proceedings of the 1st Workshop on Visual Performance Analysis*, pages 24 – 27, Nov. 2014

[7] K. E. Isaacs, A. Giménez, I. Jusufi, T. Gamblin, A. Bhatele, M. Schulz, B. Hamann, and P.-T. Bremer. State of the art of performance visualization. In *Eurographics/IEEE Conference on Visualization State-of-the-Art Reports*, EuroVis '14, 2014

[8] A. Bhatele, K. Mohror, S. H. Langer, and K. E. Isaacs. There goes the neighborhood: performance degradation due to nearby jobs. In *Proceedings of the ACM/IEEE Conference on Supercomputing (SC13)*, SC '13, Nov. 2013

[9] A. Bhatele, T. Gamblin, S. H. Langer, P.-T. Bremer, E. W. Draeger, B. Hamann, K. E. Isaacs, A. G. Landge, J. A. Levine, V. Pascucci, M. Schulz, and C. H. Still. Mapping applications with collectives over sub-communicators on torus networks. In *Proceedings of ACM/IEEE Conference on Supercomputing (SC12)*, SC '12, Nov. 2012

[10] A. Bhatele, T. Gamblin, K. E. Isaacs, B. T. N. Gunney, M. Schulz, P.-T. Bremer, and B. Hamann. Novel views of performance data to analyze large-scale adaptive applications. In *Proceedings of ACM/IEEE Conference on Supercomputing (SC12)*, SC '12, Nov. 2012

[11] M. Schulz, A. Bhatele, P.-T. Bremer, T. Gamblin, K. Isaacs, J. A. Levine, and V. Pascucci. Creating a tool set for optimizing topology-aware node mappings. In *5th Parallel Tools Workshop*, Sept. 2011

Extended Abstracts

[1] K. E. Isaacs, T. Gamblin, A. Bhatele, P.-T. Bremer, M. Schulz, and B. Hamann. Extracting logical structure and identifying stragglers in parallel execution traces. In *Proceedings 19th ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming*, PPoPP '14, pages 397–398, 2014

[2] K. E. Isaacs, A. G. Landge, T. Gamblin, P.-T. Bremer, V. Pascucci, and B. Hamann. Exploring performance data with Boxfish. In *Proceedings of the 2012 SC Companion: ACM/IEEE Conference on Supercomputing*, SCC '12, pages 1380–1381, Nov. 2012

Book Chapters

[1] M. Schulz, J. Belak, A. Bhatele, P.-T. Bremer, G. Bronevetsky, M. Casa, T. Gamblin, K. E. Isaacs, I. Laguna, J. A. Levine, V. Pascucci, D. Richards, and B. Rountree. Performance analysis techniques for the exascale co-design process. In M. Bader, A. Bode, H.-J. Bungartz, M. Gerndt, G. R. Joubert, and F. Peters, editors, *Parallel Computing: Accelerating Computational Science and Engineering, Proceedings of the International Conference on Parallel Programming, ParCo 2013*, Advances in Parallel Computing, pages 19–32. IOS Press, Mar. 2014

[2] K. Isaacs, J. Hsieh, and M. Moh. Extending OSPF for MANET routing. In S. Khan, J. Lloret, J. Ortiz, and J. Loo, editors, *Mobile Ad hoc Networks: Current Status and Future Trends*. CRC Press: Taylor and Francis, Auerbach-Publications, 2011

Technical Reports

[1] F. Beck, A. Bergel, C.-P. Bezemer, and K. E. Isaacs. Visualizing systems and software performance - report on the gi-dagstuhl seminar for young researchers, july 9-13, 2018. https://peerj.com/preprints/27253/, 2018

Presentations

[1] K. E. Isaacs. Enabling fine-grained exploration of application performance through visualization. Invited Talk. Los Alamos National Laboratory, Los Alamos, NM USA, August 8, 2018

[2] K. Isaacs. The state of the practice of performance visualization. Invited Keynote. 3rd Workshop on Visual Performance Analsyis, VPA '16, Salt Lake City, UT, USA, November 18, 2016

[3] K. Isaacs. Understanding parallel computing through visualization. Computer Science Colloquium, Sonoma State University, November 12, 2015

[4] K. Isaacs. An organized view of MPI and Charm++ traces. Contributed Talk. 13th Annual Workshop on Charm++ and its Applications, Charm++ Workshop '15, Urbana, IL, USA, May 7, 2015

[5] K. E. Isaacs. Boxfish: Mapping performance data and visualizations. Invited Talk. Lawrence Berkeley National Laboratory, Berkeley, CA USA, March 26, 2015

[6] K. E. Isaacs and T. Gamblin. Introduction to performance analysis. Workshop on Visualization and Analysis of Performance on Large-scale Software, Atlanta, Georgia USA, October 14, 2013

[7] K. Isaacs. A statistical method for environmental prediction in metagenomic samples. Contributed Talk. Joint Math Meetings, San Francisco, California USA, January 14, 2010

Professional Experience

2016 – Present	Assistant Professor, University of Arizona, Department of Computer Science *Interests: Data Visualization, High Performance Computing*
Summer 2015	Software Engineering Intern, Facebook *Team: Data Science Infrastructure, Decision Tools*
Summer 2011 & Summer 2012	Computation Intern, Lawrence Livermore National Laboratory Supervisor: Dr. Peer-Timo Bremer *Research topic: Visualization of communication performance data*
9/2009 – 9/2010	Undergraduate Researcher, Department of Computer Science, San José State University Supervisor: Professor Melody Moh *Research topic: Routing algorithms for mobile ad-hoc networks*
Fall 2009	Research Team Leader, Department of Mathematics, San José State University Supervisor: Professor Martina Bremer *Research topic: Linear state space models to detect avionics failures*
Summer 2009	Research Fellow, Department of Mathematics, San Diego State University Supervisor: Professor Imre Tuba *Research topic: Statistical analysis of metagenome data*
Spring 2008	Undergraduate Researcher, Department of Mathematics, San José State University Supervisor: Professor Slobodan Simić *Research topic: Gamma ray propagation in discrete spacetime*

Professional Activities

2018	Co-Organizer GI-Dagstuhl Seminar on Visualizing Systems and Software Performance
2018	Co-Chair Workshop on Visual Performance Analysis (VPA) @ SC
2018	Co-Chair VISSOFT NIER/Tools Track
2017, 2018	Co-Chair, Posters, LDAV
2015, 2016	Co-Chair, Student Volunteers, IEEE VIS
Program Committees	InfoVis 2018, SciVis 2018, SC 2018 (Performance) SC 2017 (Performance), LDAV 2017, VISSOFT 2017, VPA 2017, ISPASS 2017 IEEE CLUSTER 2017 Posters LDAV 2016, VPA 2016, VISSOFT NIER Track 2016
Reviewer	EuroVis 2018, PacificVAST 2018 EuroVis 2017, InfoVis 2017 EuroVis 2016, InfoVis 2016, VAST 2016, VISSOFT AEC 2015,

	VAST 2015, EuroVis 2015, VMLS 2013
	ICT 2017
	TPDS 2016
	SC16 BoFs
Memberships	ACM, IEEE CS, IEEE VGTC

Community Involvement

2016 – Present	Member, CS4AllAZ State Task Force
2013 – Present	Moderator, Student ResearcHers, a Systers technical interest community
2018	Mentor, Google Summer of Code
2015	Organizer, Birds of a Feather: *It's Okay to Fail*, Grace Hopper Celebration
2015	Panelist, *Women in Computing Societies at University*, Grace Hopper Celebration
2013 – 2015	Instructor, GirlsWhoCode Club, Dougherty Valley High School
2011 – 2015	Co-Organizer, Women in Computer Science, University of California, Davis
2012 – 2013	Mentor, Women in Science and Engineering (WISE), University of California, Davis
2009 – 2011	Events Coordinator, Math Club, San José State University
Spring 2010	Co-Organizer, Women in Computing Speaker Series, San José State University

Software

CFGExplorer	http://github.com/HDC-Arizona/CFGExplorer
graphterm	http://github.com/kisaacs/graphterm
Ravel	http://github.com/LLNL/Ravel
Boxfish	http://github.com/LLNL/Boxfish