

Olga Pearce

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Research Interests

Parallel and distributed computing, parallel algorithms and optimizations, distributed data structures, parallel performance modeling and optimization, application load balancing, parallel programming models, communication on heterogeneous architectures, generic parallel libraries, performance tools, and system benchmarking.

Education

- 2014 **Ph.D., Computer Science**, *Texas A&M University*.
Load Balancing Scientific Applications. Advisor: Prof. Nancy M. Amato, Ph.D.
- 2004 **B.S., Computer Science and Mathematics**, *Western Oregon University*, Magnum Cum Laude.
- 2000 **A.A., Business Administration**, *International Christian University*, Kyiv, Ukraine.

Professional Experience

- 2021-present **Texas A&M University, Department of Computer Science and Engineering**, *Associate Professor of Practice*.
 - (Fall 2021) Teaching CSCE 435 Parallel Computing, 60 students
 - (Fall 2022) Teaching CSCE 435 Parallel Computing, 95 students
- 2014-present **Lawrence Livermore National Laboratory**, *Computer Scientist*.
 - (2021-present) Benchmarking Lead for the Advanced Technology Systems (ATS)
 - ATS-6: Responsible for delivering a Benchmarking Suite for LLNL's next ATS procurement. Assessing scientific problems LLNL scientists plans to solve on the machine, evaluating computational requirements of relevant simulations, and proposing a technical plan for the benchmarking suite to ensure the procured machines meet the requirements. Working with LC+WSC management to assign necessary resources, supervising the execution of the plan.
 - Leading "Benchmarking across HPC Architectures" BoF at SC|22 to engage HPC community on evolving tools and methodologies for benchmarking to keep up with the hardware and software landscape.
 - ATS-5: Working with tri-labs and HQ to support LANL in delivering a Benchmarking Suite for LANL's next ATS procurement.
 - ATS-3: Responsible for benchmarking El Capitan and early access systems, overseeing a team of 5 LC staff, negotiating with vendors, and bringing in LC management as necessary.
 - (2019-present) (879k/year) Principal Investigator for Performance Analysis and Visualization at Exascale (PAVE) Project, which includes the following projects:
 - Thicket, a performance analysis tool for multi-experiment, multi-architecture, and multi-tool data.
 - Hatchet, a call-tree based tool for performance analysis of HPC applications [17, 20, 47].
 - Callflow, multi-view performance visualization tool.
 - (2018-present) LLNL application point of contact for CORAL1 and CORAL2 Tools Working Groups [46].
 - (2018-present) LLNL application point of contact for CORAL1 and CORAL2 Messaging Working Groups [6, 16, 45, 48, 49].
 - (2020-2022) Predictive Science Academic Alliance Program (PSAAP) Tri-Lab Strategy Team, Center for Understandable, Performant Exascale Communication Systems, University of New Mexico, University of Tennessee at Chattanooga, and University of Alabama at Birmingham.
 - Developing techniques and tools for analyzing and optimizing performance of large scale multiphysics simulations on homogeneous and heterogeneous architectures, including Caliper [9, 50, 53, 29, 56, 57].
 - Developing techniques and tools for load balancing scientific applications [7, 22].
 - Developing parallel programming models and tools, including RAJA [8, 18, 19, 21, 51, 52, 58, 63].
 - Developing communication techniques for heterogeneous architectures [5]. Exploratory benchmark Comb [45, 48, 49]. Member of MPI Hybrid & Accelerator Working Group.

- 2009-2014 **Lawrence Livermore National Laboratory**, *Lawrence Scholar*.
- Developed a model enabling the comparison of and selection among balancing algorithms for a specific state of a simulation [12].
 - Developed an accurate and fast method to evaluate and balance the load in N-Body simulations with highly non-uniform density, based on adaptive sampling [11].
 - Developed a framework for decoupling and offloading the load balance computation, enabling lazy load balancing [10].
- 2004-2009 **Texas A&M University, Department of Computer Science**, *Research Assistant*.
- Worked on distributed data structures in the Standard Template Adaptive Parallel Library (STAPL), a parallel superset of the C++ Standard Template Library [13, 23, 24].
 - Designed and implemented a set of parallel algorithms for STAPL. Assisted in development of the adaptive algorithm selection framework for STAPL [14].
 - Explored the idea of lock-free containers for multi-threaded programming.
 - Worked on a Dynamic Graph Composition Library for updating graph metrics of large, dynamic graphs.
- May-Oct 2007, July-Aug 2008 **Lawrence Livermore National Laboratory**, *Research Intern*.
- Worked on load balancing a multi-physics simulation via domain repartitioning and domain replication. Devised techniques to cheaply estimate processor loads and decide when a load imbalance needs to be corrected. Incorporated multi-constraint repartitioning (data parallelism) and domain replication (task parallelism) as a way to correct imbalance.

Conferences & Workshops Organized

- 2019-Present **Salishan Conference on High Speed Computing**, *Co-Chair*.
Conference on computer architecture, languages, and algorithms organized by the tri-labs (LLNL, LANL, Sandia). 150+ attendees.
- 2018-Present **JOWOG 34 Applied Computer Science (ACS)**, *Co-Chair*.
Scalable algorithms & simulation techniques for LLNL, LANL, Sandia (US) and AWE (UK). 150+ attendees.
- 2021-present **Summit Series**, *Co-organizer*.
NVIDIA and National Labs. 150+ attendees.
- 2018-2021 **Nuclear Explosives Code Development Conference (NECDC)**, *Co-Chair*.
Fundamental and applied research topics related to computational simulation. 300+ attendees.
- 2018 **Students@SC Program at ACM/IEEE Supercomputing Conference (SC)**, *Vice-chair*.
Organized 2-day program for undergraduate and graduate students at SC. 200+ attendees.

Committees

- 2023 **IEEE International Parallel & Distributed Processing Symposium (IPDPS)**, *Experiments*.
- 2022 **ACM/IEEE Supercomputing Conference (SC)**, *Chair, Progr. Frameworks and System Software*.
- 2022 **Platform for Advanced Scientific Computing (PASC)**, *Co-Chair, CompSci. & Applied Math*.
- 2022 **International Conference on Parallel Processing (ICPP)**, *Co-chair, Performance Papers*.
- 2021-2022 **Exascale Computing Project (ECP)**, *Software Technology Advisory and Review Team*.
- 2021 **International Conference on Supercomputing (ISC)**, *Chair, Ph.D. Forum*.
- 2021 **International Conference on Supercomputing (ISC)**, *HPC Algorithms and Applications Papers Committee Member*.
- 2019-2021 **Lawrence Livermore National Laboratory (LLNL)**, *Labwide Laboratory Directed Research and Development (LW LDRD) Committee Member*.
- 2020,2021 **IEEE International Parallel & Distributed Processing Symposium (IPDPS)**, *Programming Models and Compilers Papers Committee Member*.
- 2020 **ACM/IEEE Supercomputing Conference (SC)**, *Performance Papers Committee Member*.
- 2020 **EuroMPI**, *Technical Papers Committee Member*.
- 2019,2020 **IEEE Cluster**, *Programming and System Software Papers Committee Member*.
- 2020 **Journal of Concurrency and Computation**, *Reviewer*.
- 2020 **International Conference on Supercomputing (ISC)**, *Vice-Chair, Ph.D. Forum*.

- 2020 **International Conference on Supercomputing (ISC)**, *Tutorials Committee Member.*
- 2015-2019 **Lawrence Livermore National Laboratory (LLNL)**, *Computation Directorate representative on Livermore Graduate Scholar Program (LGSP) Committee.*
- 2015,2019 **ACM/IEEE Supercomputing Conference (SC)**, *Research Posters Committee Member.*
- 2019 **Lawrence Livermore National Laboratory (LLNL)**, *Science and Technology Awards Committee.*
- 2019 **International Conference on Supercomputing (ISC)**, *Ph.D. Forum Committee Member.*
- 2019 **IEEE International Parallel & Distributed Processing Symposium (IPDPS)**, *Multidisciplin.*
- 2019 **Journal of Signal Processing Systems**, *Reviewer.*
- 2018 **International Conference on Parallel Processing (ICPP)**, *Chair of the Software Track.*
- 2010,2011,2018 **ACM/IEEE Supercomputing Conference (SC)**, *Tutorials Committee Member.*
- 2018 **IEEE International Conference on Cluster Computing (Cluster)**, *System Software Track.*
- 2018-present **Parallel Computing Journal**, *Reviewer.*
- 2018 **IEEE International Parallel & Distributed Processing Symposium (IPDPS)**, *Progr. Models.*
- 2018 **IEEE/ACM Intl Conf Cluster, Cloud, & Grid Computing (CCGrid)**, *Perf. Modeling & Eval.*
- 2017 **EuroMPI/USA 2017**, *Research Posters Program Committee.*
- 2017 **ACM/IEEE Supercomputing Conference (SC)**, *Perf. Measurement, Modeling, and Tools.*
- 2017 **IEEE International Conference on Cluster Computing (Cluster)**, *Apps, Algos, & Libraries.*
- 2017 **International Conference on Parallel Processing (ICPP)**, *Software.*
- 2017 **IEEE International Parallel & Distributed Processing Symposium (IPDPS)**, *Software.*
- 2016,2017 **Grace Hopper Conference**, *Computer Systems Engineering.*
- 2015 **ACM/IEEE Supercomputing Conference (SC)**, *BoF: Progr. Languages, Models, & Compilers.*
- 2011 **Small Business Innovation Research (SBIR)**, *DOE Office of Science Grant Review.*
- 2011 **ACM/IEEE Supercomputing Conference (SC)**, *Student Cluster Challenge.*
- 2008 **ACM/IEEE Supercomputing Conference (SC)**, *Broader Engagement.*

Teaching and Mentoring

- 2021-present **Teaching**, *Texas A&M University, Department of Computer Science and Engineering.*
 - (Fall 2022) CSCE 435 Parallel Computing, 95 students
 - (Fall 2021) CSCE 435 Parallel Computing, 60 students
- 2020-present **Tutorials.**
 - (May 2022) Exascale Computing Project (ECP), half-day tutorial, "[Automated application performance analysis with Caliper, Spot, and Hatchet](#)"
 - (Nov 2021) ACM/IEEE Int'l Conf. for High Performance Computing, Networking, Storage, and Analysis (SC), full-day tutorial, "[User-centric Automated Performance Analysis of Hybrid Parallel Programs](#)"
 - (Mar 2021) Exascale Computing Project (ECP), full-day tutorial, "[Automating application performance analysis with Caliper, Spot, and Hatchet](#)"
 - (July 2020) Weapons Simulation Codes (WSC), 2 tutorials, "Performance Analysis With Hatchet"

- 2015-present **Student Research Mentoring**, *Lawrence Livermore National Laboratory*.
- (Summer 2022) Garrett Hooten, CS major (Bachelors), University of Tennessee Chattanooga. Worked on instrumenting ExaMPI with Caliper and performance analysis.
 - (Spring 2022 - Present) Michael McKinsey, CS major (Masters), Texas A&M University. Working on multi-dimensional data composition for [Thicket](#).
 - (Spring 2022 - Present) Vanessa Lama, CS major (Masters), University of Tennessee. Working on metadata for [Thicket](#).
 - (Spring 2022 - Present) Treece Burgess, CS major (Masters), University of Tennessee. Working on statistics operations for [Thicket](#).
 - (Summer 2021 - Present) Daryl Hawkins, NUEN major (PhD), Texas A&M University. Working on novel transport algorithms. Working on analyzing performance of MARBL on AWS.
 - (Summer 2021) Gerald Collom, CS major (PhD), University of New Mexico. Working on persistent and partitioned MPI for heterogeneous architectures.
 - (Summer 2020 - Present) Connor Scully-Allison, CS major (PhD), University of Arizona. Working on interactive visualization for [Thicket](#). Worked on interactive visualization for [Hatchet](#). Worked on optimization of [Hatchet](#), a call-tree based tool for performance analysis of HPC applications.
 - (Spring 2020 - Present) Ian Lumsden, CS major (PhD), University of Tennessee. Working on a query language for [Hatchet](#), a call-tree based tool for performance analysis of HPC applications.
 - (Summer 2020) Kawthar Shafie Khorassani, CS major (PhD), The Ohio State University. Worked on GPUDirect Async Designs with MVAPICH2-GDR.
 - (Summer 2020) Katy Williams, CS major (PhD), University of Arizona. Worked on interactive tree visualization for [Hatchet](#), a call-tree based tool for performance analysis of HPC applications.
 - (Fall 2019 - Present) Bengisu Elis, CS major (PhD), Technical University of Munich, Germany. Working on research directions for MPI on heterogeneous architectures.
 - (Fall 2019 - Present) Suraj Kesavan, CS major (PhD), University of California Davis. Working on research directions for performance visualization.
 - (Summer 2018 and 2019) David Eberius, CS major (PhD), University of Tennessee. Worked on porting [CoMD](#), an ExMatEx proxy application to [RAJA](#), and optimizing communication on GPUs. Worked on load balancing metrics for heterogeneous architectures.
 - (Summer 2018) Kewen Meng, CS major (PhD), University of Oregon. Worked on porting [CoMD](#), an ExMatEx proxy application to [RAJA](#), and optimizing performance for the CUDA RAJA backend.
 - (Summer 2016) Hadia Ahmed, CS major (PhD), University of Alabama at Birmingham. Studied performance impact of initial load imbalance and dynamic imbalance in the modified version of [CoMD](#), an ExMatEx proxy application.
 - (Summer 2015) Rasmus Larsen, CS major (MS), University of Copenhagen. Enabled overdecomposition and dynamic work redistribution in [CoMD](#), an ExMatEx proxy application. Implemented a mechanism for introducing initial load imbalance and varying the imbalance throughout the simulation to facilitate exploration of various load balancing schemes.
- 2007 **Student Team Mentoring**, *Cluster Challenge*, ACM/IEEE Supercomputing Conference (SC).
- Mentored teams participating in the challenge, provided technical expertise in parallel performance and parallel applications ported by the teams to their clusters during the challenge.
- 2005-2009 **Student Research Mentoring**, *Texas A&M University*.
- Jeremy Vu, CSE major, Texas A&M University. Worked on parallel algorithms in STAPL.
 - Harshvardhan, CS major, Texas A&M. Worked on STAPL Graph, Dynamic Graph Composition Library.
 - Kelli Bacon, CRA-W DMP Program. CE major, Gonzaga U. Dynamic Graph Composition Library.
 - Saransh Mittal, CSE major, Indian Inst. of Technology, Bombay. Dynamic Graph Composition Library.
 - Anna Tikhonova, CRA-W DMP Program. CS major, U. of San Francisco. Parallel algorithms in STAPL.
- 2006 **Fellow**, *Graduate Teaching Academy*, Texas A&M University.
- 2006 **Student Mentoring Award**, *Aggie Women in Comp. Science (AWICS)*, Texas A&M University.

Awards

- 2022 **Weapons and Complex Integration (WSI) Silver Award**, *Lawrence Livermore National Laboratory*, Early Access System for ATS-3 (EAS-3) acceptance.
- 2022 **Weapons Simulation Codes (WSC) Bronze Award**, *Lawrence Livermore National Laboratory*, JOWOG 34 Applied Computer Science meeting.
- 2021 **Weapons Simulation Codes (WSC) Bronze Award**, *Lawrence Livermore National Laboratory*, Multi-physics team for developing GPU capabilities of the Next Gen multi-physics code, MARBL.

- 2021 **Computing Directorate Noteworthy Achievement Award**, *Lawrence Livermore National Laboratory*, for co-chairing three major technical meetings in a span of 3 months.
- 2020 **Weapons Simulation Codes (WSC) Monthly Award**, *Lawrence Livermore National Laboratory*, for leading the JOWOG 34 ACS meeting.
- 2020 **Design Physics Division (DPD) Bronze Award**, *Lawrence Livermore National Laboratory*, for authoring an article in *Journal of Weapon Physics*.
- 2019 **Weapons and Complex Integration (WCI) Gold Award**, *Lawrence Livermore National Laboratory*, for porting and optimization of programmatic application codes on Sierra.
- 2018 **Weapons Simulation Codes (WSC) Computational Physics Silver Star Award**, *Lawrence Livermore National Laboratory*, for developing and applying the RAJA performance portability programming model.
- 2015 **Deputy Director's for Science and Technology (DDS&T) Excellence in Publication Award**, *Lawrence Livermore National Laboratory*, for work in load balancing.
- 2009-2014 **Lawrence Graduate Scholar Program (LGSP)**, *Lawrence Livermore National Laboratory*.
Technical Supervisor: Bronis R. de Supinski, Ph.D.
- 2006-2009 **NSF Graduate Research Fellowship (NSF GRF)**, Texas A&M University.
- 2004-2007 Graduate Assistance in Areas of National Need Fellowship (**GAANN**), Texas A&M University.
- 2004-2005 Association of Former Students Fellowship, Texas A&M University.
- 2007-2011 Broader Engagement grant recipient, Supercomputing Conference.
- 2007 Award to attend CRA-W/CDC Programming Languages Workshop.
- 2005-2007 Award to attend and speak at CRA-W Grad Cohort, Computing Research Association.
- 2004 Award to attend Grace Hopper Conference and DMP reunion, Computing Research Association.
- 2003,2004 Distributed Mentor Project (**DMP**); Computing Research Association.
- 2004 Outstanding Senior in Computer Science; Western Oregon University.
- 2003 Outstanding Achievement in Computer Science, Outstanding Achievement in Mathematics.
- 2003 Who's Who Among Students in American Colleges and Universities, Phi Kappa Phi member.
- 1997 Future Leaders Exchange Program (**FLEX**); one of one hundred recipients nationwide.
U.S. Department of State, Freedom Support Act.

Skills

General	C/C++, Java, Python, git, svn, CVS, autotools, CMake.
High Performance Computing	Parallel performance tool development in C/C++. MPI profiling tools, runtime systems. Parallel algorithms and data structures. Measurement, analysis, and tuning of parallel applications on large clusters (IBM Blue Gene, Linux). Experience with large physics codes at LLNL.
Load Balancing	Measurement tools, load analysis metrics, (hyper)graph partitioners, load balancing algorithms.
Graduate Coursework	Algorithm Analysis, Parallel Algorithms, Generic Programming, Programming Languages, C++ Language Design, Computer Architecture, Compiler Design, Machine Learning, Numerical Methods, Supercomputing, and Runtime Systems.
Languages	English (fluent), Ukrainian (native), Russian (fluent)

Publications

Selected Refereed Publications. * denotes students I supervised.

- [1] H. Abu-Shawareb et al. (Indirect Drive ICF Collaboration). Lawson's criteria for ignition exceeded in an inertial fusion experiment. In *Physical Review Letters* 129, 075001, 8 August 2022. (N210808).
- [2] Ian Lumsden*, Jakob Luettgau, Vanessa Lama*, Connor Scully-Allison*, Stephanie Brink, Katherine E. Isaacs, **Olga Pearce**, and Michela Tauber. Enabling Call Path Querying in Hatchet to Identify Performance Bottlenecks in Scientific Applications. In *IEEE eScience*, October 2022. LLNL-CONF-83569.

- [3] Suraj P. Kesavan*, Harsh Bhatia, Abhinav Bhatele, Stephanie Brink, **Olga Pearce**, Todd Gamblin, Peer-Timo Bremer, and Kwan-Liu Ma. Scalable Comparative Visualization of Ensembles of Call Graphs using CallFlow. In *IEEE Transactions on Visualization and Computer Graphics (TVCG)*, November 2021.
 - [4] David Boehme, Pascal Aschwenden, **Olga Pearce**, Kenneth Weiss, and Matthew LeGendre. Ubiquitous Performance Analysis. In *International Supercomputing Conference (ISC'21)*, June 2021.
 - [5] Bengisu Elis*, Dai Yang, **Olga Pearce**, Kathryn Mohror, and Martin Schulz. QMPI: A Next Generation MPI Profiling Interface for Modern HPC Platforms. In *Journal of Parallel Computing*, 2020. LLNL-JRNL-787898.
 - [6] Christopher Zimmer, Scott Atchley, Ramesh Pankajakshan, Brian E. Smith, Ian Karlin, Matt Leininger, Adam Bertsch, Brian S. Ryujin, Jason Burmark, André Walker-Loud, M. A. Clark, and **Olga Pearce**. An Evaluation of the CORAL Interconnects. In *ACM/IEEE International Conference for High Performance Computing, Networking, Storage, and Analysis (SC'19)*, 2019. LLNL-CONF-772398.
 - [7] **Olga Pearce**, Hadia Ahmed*, Rasmus W. Larsen*, Peter Pirkelbauer, and David F. Richards. Exploring Dynamic Load Imbalance Solutions with the CoMD Proxy Application. In *Future Generation Computer Systems (FGCS)*, 2018. LLNL-JRNL-725317.
 - [8] David Beckingsale, **Olga Pearce**, Ignacio Laguna, and Todd Gamblin. Apollo: Reusable Models for Fast, Dynamic Tuning of Data-Dependent Code. In *IEEE International Parallel & Distributed Processing Symposium (IPDPS'17)*, Orlando, Florida, USA, May 29 - June 2, 2017.
 - [9] David Boehme, Todd Gamblin, David Beckingsale, Peer-Timo Bremer, Alfredo Giménez, Matthew LeGendre, **Olga Pearce**, and Martin Schulz. Caliper: Performance Introspection for HPC Software Stacks. In *ACM/IEEE International Conference for High Performance Computing, Networking, Storage, and Analysis (SC'16)*, Salt Lake City, Utah, USA, November 13-18, 2016. LLNL-CONF-699263. (18%).
 - [10] **Olga Pearce**, Todd Gamblin, Bronis R. de Supinski, Martin Schulz, and Nancy M. Amato. MPMD Framework for Offloading Load Balance Computation. In *IEEE International Parallel & Distributed Processing Symposium (IPDPS'16)*, Chicago, Illinois, USA, May 23-27, 2016. LLNL-CONF-678165. (23%).
 - [11] **Olga Pearce**, Todd Gamblin, Bronis R. de Supinski, Tom Arsenlis, and Nancy M. Amato. Load Balancing N-Body Simulations with Highly Non-Uniform Density. In *International Conference on Supercomputing (ICS'14)*, Munich, Germany, June 10-13, 2014. LLNL-CONF-648577. (21%).
 - [12] **Olga Pearce**, Todd Gamblin, Bronis R. de Supinski, Martin Schulz, and Nancy M. Amato. Quantifying the Effectiveness of Load Balance Algorithms. In *International Conference on Supercomputing (ICS'12)*, Venice, Italy, June 25-29, 2012. LLNL-CONF-523343. (22%).
 - [13] Gabriel Tanase, Antal A. Buss, Adam Fidel, Harshvardhan*, Ioannis Papadopoulos, **Olga Pearce**, Timmie G. Smith, Nathan Thomas, Xiabing Xu, Nedat Mourad, Jeremy Vu, Mauro Bianco, Nancy M. Amato, and Lawrence Rauchwerger. The STAPL Parallel Container Framework. In *ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming (PPoPP)*, pages 235–246, 2011. (16%).
 - [14] Nathan Thomas, Gabriel Tanase, **Olga Tkachyshyn**, Jack Perdue, Nancy M. Amato, and Lawrence Rauchwerger. A Framework for Adaptive Algorithm Selection in STAPL. In *ACM SIGPLAN Principles and Practice of Parallel Programming (PPoPP)*, pages 277–288, 2005. (31%).
- Refereed Publications in Conferences and Journals (additional). * denotes students I supervised.**
- [15] David Eberius*, David Boehme, and **Olga Pearce**. Did the GPU obfuscate the load imbalance in my MPI simulation? In *SC'21 Hierarchical Parallelism for Exascale Computing (HiPar) Workshop*, Nov 2021. LLNL-CONF-826447.

- [16] J. P. Dahm, D. F. Richards, A. Black, A. D. Bertsch, L. Grinberg, I. Karlin, S. Kokkila-Schumacher, E. A. Leon, R. Neely, R. Pankajakshan, and **Olga Pearce**. Sierra Center of Excellence: Lessons Learned. In *IBM Journal of Research and Development*, 2020. LLNL-JRNL-789080.
- [17] Stephanie Brink, Ian Lumsden*, Connor Scully-Allison*, Katy Williams*, **Olga Pearce**, Todd Gamblin, Michela Taufer, Katherine E. Isaacs, and Abhinav Bhatele. Usability and Performance Improvements in Hatchet. In *SC'20 ProTools Workshop*, Nov 2020. LLNL-CONF-814318.
- [18] David Alexander Beckingsale, Jason Burmark, Rich Hornung, Holger Jones, William Killian, Adam J. Kunen, **Olga Pearce**, Peter Robinson, Brian S. Ryuji, and Thomas R. W. Scogland. RAJA: Portable Performance for Large-Scale Scientific Applications. In *SC'19 P3HPC Workshop*, 2019. LLNL-CONF-788757.
- [19] **Olga Pearce**. Exploring Utilization Options of Heterogeneous Architectures for Multi-Physics Simulations. In *Parallel Computing Journal*, May 2019. LLNL-JRNL-762237.
- [20] Alexandre Bergel, Abhinav Bhatele, David Boehme, Patrick Gralka, Kevin Griffin, Marc-Andre Hermanns, Dusan Okanovic, **Olga Pearce**, and Tom Vierjahn. Visual Analytics Challenges in Analyzing Calling Context Trees. In *Workshop on Visual Performance Analysis (VPA 18) at SC18*, November 2018. LLNL-CONF-756548.
- [21] **Olga Pearce**. Experiences Using CPUs and GPUs for Cooperative Computation in a Multi-Physics Simulation. In *Workshop on Parallel Programming Models and Systems Software for High-End Computing (P2S2 2018) at the International Conference on Parallel Processing (ICPP 2018) Conference*, August 2018. LLNL-CONF-738086.
- [22] **Olga Pearce**, Hadia Ahmed*, Rasmus W. Larsen*, and David F. Richards. Enabling Work Migration in CoMD to Study Dynamic Load Imbalance Solutions. In *Performance Modeling, Benchmarking and Simulation of High Performance Computer Systems (PMBS'16) held as part of ACM/IEEE International Conference for High Performance Computing, Networking, Storage, and Analysis (SC'16)*, Salt Lake City, Utah, USA, November 13, 2016. LLNL-CONF-704368. (22%).
- [23] Antal A. Buss, Harshvardhan*, Ioannis Papadopoulos, **Olga Pearce**, Timmie G. Smith, Gabriel Tanase, Nathan Thomas, Xiabing Xu, Mauro Bianco, Nancy M. Amato, and Lawrence Rauchwerger. STAPL: Standard Template Adaptive Parallel Library. In *3rd Annual Haifa Experimental Systems Conference (SYSTOR)*, 2010.
- [24] Gabriel Tanase, Xiabing Xu, Antal A. Buss, Harshvardhan, Ioannis Papadopoulos, **Olga Pearce**, Timmie G. Smith, Nathan Thomas, Mauro Bianco, Nancy M. Amato, and Lawrence Rauchwerger. The STAPL pList. In *22nd International Workshop on Languages and Compilers for Parallel Computing (LCPC)*, pages 16–30, 2009.

Unrefereed Publications and Technical Reports. * denotes students I supervised.

- [25] **Olga Pearce** and Stephanie Brink. Analyze your multi-experiment, multi-architecture, and multi-tool performance data with Thicket. In *ProTools Workshop at SC/22*, November 2022.
- [26] **Olga Pearce**. Finding the forest in the trees: Enabling performance optimization on heterogeneous architectures through data science analysis of ensemble performance data. In *Workshop on Clusters, Clouds, and Data for Scientific Computing (CCDSC)*, September 2022.
- [27] Stephanie Brink, Todd Gamblin, and **Olga Pearce**. Pinpointing Performance Bottlenecks with Hatchet. In *Nuclear Explosives Code Development Conference (NECDC) and Journal of Weapons Physics (JWP)*, January 2022. LLNL-JRNL-827068.
- [28] **Olga Pearce**. Caliper, SPOT, and Hatchet: Enabling the Whys and the Wherefores of Personal Analysis. In *CASC Newsletter*, June 2020.
- [29] **Olga Pearce**. What if Components of Your Multiphysics Simulation Need to Use Your Heterogeneous Machine Differently? In *Nuclear Explosives Code Development Conference (NECDC) and Journal of Weapons Physics (JWP)*, January 2019. LLNL-PROC-765162.

- [30] **Olga Pearce**. Impact of Mesh Decomposition on Performance of Teton. In *Nuclear Explosives Code Development Conference (NECDC)*, January 2017. LLNL-PROC-718463.
- [31] Richard Hornung, **Olga Pearce**, Adam Kunen, Jeff Keasler, Holger Jones, Rob Neely, and Todd Gamblin. Demonstrating Advances in Proxy Applications Through Performance Gains and/or Performance Portable Abstractions: CoMD and Kripke with RAJA. In *SIAM Conference on Parallel Processing for Scientific Computing (SIAM PP)*, March 2016. LLNL-TR-677453.
- [32] Rasmus Wriedt Larsen* and **Olga Pearce**. Enabling Load Balancing in CoMD through Overdecomposition. Technical Report LLNL-TR-678978, Lawrence Livermore National Laboratory, November 2015.
- [33] Rich Hornung, Holger Jones, Jeff Keasler, Rob Neely, **Olga Pearce**, Si Hammond, Christian Trott, Paul Lin, Courtenay Vaughan, Jeanine Cook, Mahesh Rajan, Rob Hoekstra, Ben Bergen, Josh Payne, and Geoff Womeldorff. ASC Tri-lab Co-design Level 2 Milestone Report. Technical Report LLNL-TR-677453, Lawrence Livermore National Laboratory, Sandia National Laboratories, Los Alamos National Laboratory, September 2015.
- [34] Anna Tikhonova*, Gabriel Tanase, **Olga Tkachyshyn**, Nancy M. Amato, and Lawrence Rauchwerger. Parallel algorithms in STAPL: Sorting and the selection problem. Technical Report TR05-005, Parasol Lab, Department of Computer Science, Texas A&M University, August 2005.
- [35] Jie Liu, **Olga Tkachyshyn**, Cory Kissinger, and Brian McGee. Teaching parallel programming and building parallel computers. In *International Conference on Frontiers in Education: Computer Science and Computer Engineering*, pages 149–155, June 2005.
- [36] **Olga Tkachyshyn**, Ping An, Gabriel Tanase, and Nancy M. Amato. pArray as an efficient static parallel container in STAPL. Technical Report TR03-003, Parasol Lab, Department of Computer Science, Texas A&M University, August 2003.

Ph.D. Dissertation

- [37] **Olga Pearce**. *Load Balancing Scientific Applications*. PhD thesis, Texas A&M University, College Station, TX, December 2014. LLNL-TH-663256.

Posters and Presentations. * denotes students I supervised.

- [38] Connor Scully-Allison*, **Olga Pearce**, and Kate Isaacs. Missing the Trees for the Branches: Graphical-Scripting Interaction with Large-Scale Calling Context Trees. In *SC'21*, November 2021. LLNL-POST-825367.
- [39] **Olga Pearce**. Visualizing GPU Metrics. In *Summit Series*, NVIDIA, Oct 27, 2021. LLNL-PRES-828300.
- [40] **Olga Pearce**. Keynote: MPI & Accelerators: So you thought you were waiting for data to transfer? In *EuroMPI*, Sept 7, 2021.
- [41] **Olga Pearce**. Invited panelist. In *1st Workshop on Performance Engineering, Modeling, Analysis, and Visualization Strategy (PERMAVOST 2021) at ACM HPDC 2021*, June 25, 2021.
- [42] Todd Gamblin Olga Pearce, Stephanie Brink. Pinpointing performance bottlenecks with Hatchet. In *Nuclear Explosives Code Development Conference (NECDC'21)*, LLNL, May 12, 2021. LLNL-PRES-821461.
- [43] Suraj P. Kesavan*, Harsh Bhatia, Abhinav Bhatele, Stephanie Brink, **Olga Pearce**, Todd Gamblin, Peer-Timo Bremer, and Kwan-Liu Ma. Scalable Comparative Visualization of Ensembles of Call Graphs using CallFlow. In *SC'20*, November 2020. LLNL-POST-813361.
- [44] Stephanie Brink and **Olga Pearce**. Tutorial: Performance Analysis with Hatchet. Lawrence Livermore National Laboratory, August 2020. LLNL-PRES-813307.

- [45] **Olga Pearce**. Updates on Halo Exchange on Sierra. In *Summit on Summit and Sierra*, NVIDIA, April 15, 2020. LLNL-PRES-808639.
- [46] **Olga Pearce**. Application teams feedback on performance tools. In *CORAL 2 Quarterly Meeting*, March 25, 2020. LLNL-PRES-807675.
- [47] Stephanie Brink, Abhinav Bhatele, Todd Gamblin, and **Olga Pearce**. Hatchet: Pruning the Overgrowth in Parallel Profiles. In *JOWOG 34 Applied Computer Science*, Lawrence Livermore National Laboratory, February 24-27, 2020.
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