

Taylor L. Groves

CONTACT INFORMATION	taylorlgroves@gmail.com	http://taylorgroves.com
NATIONALITY	American	
RESEARCH FOCUS	High Performance and Distributed Computing, Network Simulation, Power and Performance Modeling, Monitoring, Data Collection and Aggregation, System Evaluation.	
EDUCATION	University of New Mexico , Albuquerque, NM Ph.D., Computer Science, 2017 <ul style="list-style-type: none">• Thesis Topic: <i>Power and Performance of High Performance Networks</i>• Advisor: Dorian C. Arnold M.S., Computer Science, 2012 Texas State University , San Marcos, TX B.S., Computer Science, 2009 <ul style="list-style-type: none">• Minor in Mathematics UC Berkeley Executive Education , Berkeley, CA New Manager Boot-camp, 2018	
RESEARCH EXPERIENCE	HPC Architecture and Performance Engineer <i>Berkeley National Laboratory, NERSC</i>	Mar 2017 to present
	Lead for HPC Network Performance in Perlmutter 2020 system (\$146 million). Characterized communication and system load of a diverse set of 7000+ workloads on existing system to forecast trends in network demands. Simulated and modeled workload performance under varying network constraints to establish hardware and topology requirements of future systems. Developed benchmarks for system evaluation and acceptance.	
	Graduate Researcher <i>Sandia National Laboratories, Center for Computing Research</i>	May 2014 to Mar 2017
	1) Explored power and performance trade-offs in large scale Infiniband networks, including dynamic link width power savings. 2) Investigated the impact of kernel bypass in communication (RDMA) and interactions with the memory subsystem. This revealed significant performance penalties and cache pollution, which increased the runtime of memory bound codes by 3X. Proposed and analyzed three solutions: core specialization, offload NICs and bandwidth throttling.	
	Graduate Research Assistant <i>University of New Mexico, Scalable Systems Laboratory</i>	Jan 2010 to May 2014
	Developed models and extensions for scalable multicast and reduction framework (MRNet). Code deployed on HPC systems at Lawrence Livermore National Laboratories to provide optimal process launching strategies.	
	Graduate Intern <i>Yahoo!, Network Infrastructure Group</i>	May 2013 to Aug 2013
	Deployed OpenTSDB on a virtualized cluster for evaluation of monitoring strategies and frameworks. Developed a push-based collection and analysis agent that ran on the network switches to provide scalable network monitoring. This provided increased granularity of system feedback (compared to SNMP) with lower overhead.	

Undergraduate Research Assistant
Texas State University, Department of Computer Science

Oct 2008 to May 2009

Developed a Java simulator for evaluating strategies for routing in unreliable, mobile networks. Using probabilistic, rather than set rules for forwarding, we maintained delivery rates while reducing total traffic on the network.

Quality Assurance Engineer
Kula Media Group

Nov 2006 to Nov 2008

Performed quality assurance for a video encoding start-up. Evaluated video quality using metrics such as PSNR and profiled encoder performance. Encoder used for live streaming for MLB, Operation Myspace.

HONORS AND
AWARDS

Professional Awards

- ERA Nomination for Technical Excellence (Sandia National Labs) 2016
- Campus Ambassador of the Month (Sun Microsystems) 2009

Travel Awards

- SC18 Early Career Program, Dallas, TX 2018
- Salishan Conference on High Speed Computing, Gleneden Beach, OR 2016
- ACM/IEEE Cluster, Chicago, IL 2015
- ACM/IEEE Supercomputing Conference, New Orleans, LA 2010

Student Awards

- Undergraduate Research Excellence 2009
- Dean's List 2008-2009
- Service Award - Sigma Chi Sigma 2008-2009

Service Awards

- Eagle Scout (Boy Scouts of America) 2005

PEER
REVIEWED
PUBLICATIONS

1. Sudheer Chunduri, **Taylor Groves**, Peter Mendygral, Brian Austin, Jacob Balma, Krishna Kandalla, Kalyan Kumaran, Glenn Lockwood, Scott Parker, Steven Warren, Nathan Wichmann, Nicholas Wright (2019) "GPCNeT: Designing a Benchmark Suite for Inducing and Measuring Contention in HPC Networks.", in International Conference of High Performance Computing, Networking, Storage and Analysis (SC'19) (21% acceptance)
2. George Michelogiannakis, Yiwen Shen, Min Yee Teh, Xiang Meng, Benjamin Aivazi, **Taylor Groves**, John Shalf, Madeleine Glick, Manya Ghobadi, Larry Dennison, Keren Bergman (2019) "Bandwidth Steering in HPC using Silicon Nanophotonics", International Conference on High Performance Computing, Networking, Storage and Analysis (SC'19) (21% acceptance)
3. Tiffany Connors, **Taylor Groves**, Tony Quan, Scott Hemmert (2019), "Simulation Framework for Studying Optical Cable Failures in Dragonfly Topologies", in Workshop on Scalable Networks for Advanced Computing Systems in association with IPDPS (50% acceptance)
4. Kurt Ferreira, Ryan E. Grant, Michael J. Levenhagen, Scott Levy, **Taylor Groves** (2019), "Hardware MPI Message Matching: Insights into MPI Matching Behavior to Inform Design", Journal of Concurrency and Computation: Practice and Experience
5. Nathan Hjelm, Matthew Dosanjh, Ryan Grant, **Taylor Groves**, Patrick Bridges, Dorian Arnold (2018), "Improving MPI Multi-threaded RMA Communication Performance", in Proceedings of 47th International Conference on Parallel Processing (ICPP)
6. **Taylor Groves**, Ryan E. Grant, Aaron Gonzales, Dorian Arnold (2018), "Machine Learning to Predict, Characterize and Prevent Network-induced Memory Contention (NiMC)", in IEEE Transactions on Parallel and Distributed Systems, vol. 29, no. 8, pp. 1907-1922 (24% acceptance)
7. **Taylor Groves**, Yizi Gu, Nicholas Wright (2017) "Understanding Performance Variability on the Aries Dragonfly Network", in HPCMASPA in association with IEEE Cluster.
8. **Taylor Groves**, Ryan Grant, Scott Hemmert, Simon Hammond, Michael Levenhagen, Dorian Arnold (2016) "(SAI) Stalled, Active and Idle: Characterizing Power and Performance of Large-Scale Dragonfly Networks", In 2016 IEEE International Conference on Cluster Computing (CLUSTER), (24% acceptance).

9. **Taylor Groves**, Ryan Grant, Dorian Arnold (2016) “NiMC: Characterizing and Eliminating Network-Induced Memory Contention” In: 30th IEEE International Parallel & Distributed Processing Symposium (*IPDPS 2016*), (23% acceptance).
10. Matthew Dosanjh, **Taylor Groves**, Ryan E Grant, Patrick Bridges, Ron Brightwell (2016) “RMA-MT : A Benchmark Suite for Assessing MPI Multi-threaded RMA Performance” In: 16th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (*CCGrid 2016*), (20% acceptance).
11. **Taylor Groves**, Samuel K Gutierrez, Dorian Arnold (2015) “A LogP Extension for Modeling Tree Aggregation Networks” In: Workshop on Monitoring and Analysis for High Performance Computing Systems Plus Applications (*HPCMASPA 2015*) in association with Cluster IEEE.
12. Joshua D Goehner, **Taylor L Groves**, Dorian C Arnold, Dong H Ahn, Gregory L Lee (2013) “An Optimal Algorithm for Extreme Scale Job Launching” In: Trust, Security and Privacy in Computing and Communications (*TrustCom 2013*), 2013 12th IEEE International Conference on, (28% acceptance).
13. **Taylor Groves**, Dorian Arnold, Yihua He (2013) “In-network, Push-based Network Resource Monitoring : Scalable, Responsive Network Management” In: Proceedings of the Third International Workshop on Network-Aware Data Management (*NDM 2013*) in association with the International Conference for High Performance Computing, Networking Storage and Analysis, (64% acceptance).
14. Xiao Chen, Jian Shen, **Taylor Groves**, Jie Wu (2009) “Probability Delegation Forwarding in Delay Tolerant Networks” In: Computer Communications and Networks (*ICCCN 2009*). Proceedings of 18th International Conference on.

BOOK
CHAPTERS

1. Ryan E. Grant, **Taylor Groves**, Simon Hammond, K. Scott Hemmert, Michael Levenhagen, Ron Brightwell, Network Communications, Book Chapter, Handbook of Exascale Computing, Eds. Ishfaq Ahmad, Sanjay Ranka. ISBN:978-1466569003 copyright Chapman and Hall

INVITED TALKS

1. **Taylor Groves**, Communication Patterns: Lattice QCD Motif, Summer of CODES at ANL, August 15, 2018
2. **Taylor Groves**, Understanding Performance Variability on HPC Networks, Emory University, February 9, 2018
3. **Taylor Groves**, Networks, Damn Networks and Aries, NERSC CS/Data Seminar, October 6, 2017
4. Doug Jacobsen, **Taylor Groves**, Global Aries Counter Collection and Analysis, Cray Quarterly Meeting, July 25, 2017
5. **Taylor Groves**, Characterizing Power and Performance in HPC Networks, Future Technologies Group at ORNL, January 10, 2017
6. **Taylor Groves**, Improving Power and Performance in HPC Networks, AMD Research - Austin, June 10, 2016

POSTERS

1. **Taylor Groves** (November 2016) “Characterizing and Improving Power and Performance of HPC Networks”, Doctoral Showcase at the International Conference for High Performance Computing, Networking, Storage and Analysis (SC 2016), Salt Lake City, UT, (60% acceptance).
2. **Taylor Groves**, Ryan Grant, Dorian Arnold (April 2016) “Network-induced Memory Contention.” Poster session presented at the Salishan Conference on High Speed Computing, Glenden Beach, OR, (by invitation).

SERVICE

- The Pipeline Workshop: Diversifying the HPC Workforce 2017
- New Mexico Supercomputing Challenge 2016
- Big Brothers Big Sisters of New Mexico 2013 to 2015
- Planning Committee - Annual CS Student Conference 2012
- Treasurer of C.S. Graduate Student Association 2011 to 2012
- Local Science Fair Judge 2011 to 2013
- Planning Committee - Texas State Tech Day 2010
- V.P. of C.S. Undergraduate Student Association 2008 to 2010