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Research Interests

Distributed Systems • Runtime and Operating Systems • High-performance Computing Resilience/Fault-tolerance • Program Analysis Tools • Tool Infrastructure
Toward autonomic system software for efficient, robust high-end computing platforms.

Professional Appointments

- 2017 – **Associate Professor**, *Department of Computer Science*, Emory University.
- 2018 – **Director of Graduate Studies**, *Computer Science and Informatics*, Emory University.
- 2015 – 2017 **Associate Professor**, *Department of Computer Science*, University of New Mexico.
- 2009 – 2015 **Assistant Professor**, *Department of Computer Science*, University of New Mexico.
- 2013 **Summer Faculty**, *Department of Scalable System Software*, Sandia National Laboratories.
- 2011 – 2013 **Affiliate Research Scientist**, *Ultrascale Systems Research Center*, New Mexico Consortium.
- 2009 – 2010 **Visiting Scientist**, *Ctr. for Applied Scientific Computing*, Lawrence Livermore National Lab.
- 2006 **Technical Scholar**, *Ctr. for Applied Scientific Computing*, Lawrence Livermore National Lab.
- 1999 – 2001 **Research Associate**, *Innovative Computing Laboratory*, University of Tennessee.

Professional Preparation

- 2008 **PhD (computer science)**, *University of Wisconsin*, Madison, WI.
Dissertation: “Reliable, Scalable Tree-based Overlay Networks.” Advisor: Dr. Barton Miller.
- 1998 **MS (computer science)**, *University of Tennessee*, Knoxville, TN.
Project: “CLUBS: Checkpoint Library for Unix-based Systems.” Advisor: Dr. James Plank.
- 1996 **BS summa cum laude (math, computer science)**, *Regis University*, Denver, CO.
- 1994 **AS (math, physics, chemistry)**, *St. John’s Junior College*, Belize City, Belize.

Select Awards and Honors

- 2017–2020 Distinguished Speaker, Association for Computing Machinery (ACM)
- 2016 University of New Mexico Nominee, Blavatnik Award for Young Scientists
- 2014 Senior member, Institute of Electrical and Electronics Engineers (IEEE)
- 2011 R&D 100 Award for Development of Stack Trace Analysis Tool.
- 2006–2008 Intel Ph.D. Fellow, 1 of 41 nationally.
- 2003 Best Student Paper finalist, SC Conference.
- 1999 R&D 100 Award for Development of NetSolve Project.
- 1997 Computer Science Graduate Teaching Assistant of the Year, University of Tennessee.
- 1996 Alan M. Turing Award for Excellence in Computer Science, Regis University.
- 1995 Invited to Regis Chapter of Alpha Sigma Nu, academic honors society.
- 1994 Regis University Natural Science Scholarship (Mathematics), 1 of 2 based on open examination.
- 1992 Government of Belize Junior College Scholarship, based on national examination.

Publications

Publication Statistics

(Gathered April 2019 from Google Scholar).

- 1813 **Total Citations**, 65+ refereed articles including 22 conference papers, 13 journal papers, 29 workshop papers, 2 book chapters and 1 patent..
- 786 **Citations per Top 4 most cited articles.**
- 249 **Citations per most cited article.**
- 21 **H-index**, 21 articles cited at least 21 times.
- 11 **i40-index**, 11 articles cited at least 40 times.
- 34 **i10-index**, 34 articles cited at least 10 times.

Student advisees highlighted in [green](#); students co-advisees highlighted in [yellow](#).)

Refereed Conference Papers

- C1 [Whit Schonbein](#), Ryan E. Grant, Matthew G. F. Dosanjh, and [Dorian Arnold](#). INCA: In-Network Compute Assistance. In *The International Conference of High-Performance Computing, Networking, Storage and Analysis (SC19)*, Denver, CO, USA, 2019. To Appear.
- C2 [Nathan Hjelm](#), Matthew Dosanjh, [Taylor Groves](#), Patrick Bridges, and [Dorian Arnold](#). Improving MPI Multi-threaded RMA Communication Performance. In *47th International Conference on Parallel Processing (ICPP 2018)*, Eugene, OR, USA, August 2018.
- C3 [Samuel K. Gutiérrez](#), Kei Davis, [Dorian Arnold](#), Randal Baker, Robert Robey, Patrick McCormick, Daniel Holladay, Jon Dahl, R. Joe Zerr, Florian Weik, and Christoph Junghans. Accommodating Thread-Level Heterogeneity in Coupled Parallel Applications. In *IEEE International Parallel and Distributed Processing Symposium (IPDPS)*, Orlando, FL, USA, May 2017a.
- C4 [Taylor L. Groves](#), Ryan E. Grant, Scott Hemmert, Simon Hammond, Michael Levenhagen, and [Dorian Arnold](#). (SAI) Stalled, Active and Idle: Characterizing Power and Performance of Large-Scale Dragonfly Networks. In *2016 IEEE International Cluster Conference (Cluster)*, pages 253–262, Taipei, Taiwan, September 2016a.
- C5 [Taylor L. Groves](#), Ryan E. Grant, and [Dorian Arnold](#). NiMC: Characterizing and Eliminating Network-Induced Memory Contention. In *2016 IEEE International Parallel and Distributed Processing Symposium (IPDPS)*, pages 253–262, Chicago, IL, USA, May 2016b.
- C6 Kurt Ferreira, Patrick Widener, [Scott Levy](#), [Dorian Arnold](#), and Torsten Hoefler. Understanding the Effects of Communication on Uncoordinated Checkpointing at Scale. In *International Conference for High Performance Computing, Networking, Storage and Analysis (SC '14)*, New Orleans, LA, USA, November 2014a. Acceptance rate: 82/394, 21%.
- C7 [Ke Wang](#), [Abhishek Kulkarni](#), Michael Lang, [Dorian Arnold](#), and Ioan Raicu. Using Simulation to Explore Distributed Key-value Stores for Extreme-scale System Services. In *International Conference for High Performance Computing, Networking, Storage and Analysis (SC '13)*, Denver, CO, USA, November 2013. ACM. ISBN 978-1-4503-2378-9. Acceptance rate: 92/457, 20%.
- C8 [Joshua D. Goehner](#), [Taylor L. Groves](#), [Dorian Arnold](#), Dong H Ahn, and Gregory L Lee. An Optimal Algorithm for Extreme Scale Job Launching. In *12th IEEE International Conference on Trust, Security and Privacy in Computing and Communications (TrustCom)*, pages 1115–1122, Melbourne, Australia, 2013. IEEE. Appeared in The 11th IEEE International Symposium on Parallel and Distributed Processing with Applications (ISPA-13), July 16-18, 2013, Melbourne, Australia. Published in the described proceedings.
- C9 Rolf Riesen, Kurt Ferreira, Dilma Da Silva, Pierre Lemarinier, [Dorian Arnold](#), and Patrick G Bridges. Alleviating Scalability Issues of Checkpointing Protocols. In *High Performance Computing, Networking, Storage and Analysis (SC), 2012 International Conference for*, pages 1–11, Salt Lake City, Utah, USA, 2012. IEEE. Acceptance rate: 100/472, 21%.

- C10 [Dewan Ibtesham](#), [Dorian Arnold](#), Kurt Ferreira, and Patrick Bridges. On the Viability of Compression for Reducing the Overheads of Checkpoint/restart-based Fault Tolerance. In *Parallel Processing (ICPP), 2012 41st International Conference on*, pages 148–157, Pittsburgh, Pennsylvania, USA, September 2012. IEEE. Acceptance rate: 53/187, 28%.
- C11 Kurt Ferreira, Jon Stearley, James H Laros III, Ron Oldfield, Kevin Pedretti, Ron Brightwell, Rolf Riesen, Patrick G Bridges, and [Dorian Arnold](#). Evaluating the Viability of Process Replication Reliability for Exascale Systems. In *International Conference for High Performance Computing, Networking, Storage and Analysis (SC '11)*, page 44, Seattle, Washington, USA, November 2011b. ACM. Acceptance rate: 74/352, 21%.
- C12 Kurt Ferreira, Rolf Riesen, Ron Brightwell, Patrick Bridges, and [Dorian Arnold](#). Libhashckpt: Hash-based Incremental Checkpointing Using GPU's. In *18th European MPI Users' Group conference on Recent advances in the message passing interface (EuroMPI '11)*, pages 272–281, Santorini, Greece, September 2011a. Springer-Verlag. Acceptance rate: 81/271, 29.9%.
- C13 [Dorian Arnold](#) and Barton P Miller. Scalable Failure Recovery for High-performance Data Aggregation. In *24th IEEE International Parallel & Distributed Processing Symposium (IPDPS)*, pages 1–11, Atlanta, GA, USA, April 2010. IEEE. Acceptance rate: 127/527, 24%.
- C14 [Roy W. Keyes](#), [Cristian Romano](#), [Dorian Arnold](#), and Shuang Luan. Cloud Computing as a Monte Carlo Cluster for Radiation Therapy. In *XVth International Conference on the Use of Computers in Radiation Therapy (ICCR)*, 2010.
- C15 Gregory L Lee, Dong H Ahn, [Dorian Arnold](#), Bronis R De Supinski, Matthew Legendre, Barton P Miller, Martin Schulz, and Ben Liblit. Lessons Learned at 208k: Towards Debugging Millions of Cores. In *ACM/IEEE International Conference for High Performance Computing, Networking, Storage and Analysis (SC '08)*, Austin, TX, USA, November 2008. IEEE. Acceptance rate: 59/277, 21.3%.
- C16 Dong H Ahn, [Dorian Arnold](#), B Supinski, Gregory L Lee, Barton P Miller, and Martin Schulz. Overcoming Scalability Challenges for Tool Daemon Launching. In *37th International Conference on Parallel Processing (ICPP-08)*, pages 578–585, Portland, OR, USA, September 2008. IEEE. Acceptance rate: 81/263: 30.8%.
- C17 Aroon Nataraj, Allen Malony, Allen Morris, [Dorian Arnold](#), and Barton P Miller. In Search of Sweet-spots in Parallel Performance Monitoring. In *2008 IEEE International Conference on Cluster Computing (Cluster 2008)*, pages 69–78, Tsukuba, Japan, September 2008. IEEE. Acceptance rate: 28/92: 30.4%.
- C18 [Dorian Arnold](#), Dong H Ahn, de Supinski Bronis R, Gregory Lee, Barton P. Miller, and Martin Schulz. Stack Trace Analysis for Large Scale Applications. In *21st IEEE International Parallel & Distributed Processing Symposium (IPDPS '07), Long Beach, CA, Long Beach, CA, USA, March 2007*. Acceptance rate: 109/419: 26.0%.
- C19 Gregory L Lee, Dong H Ahn, [Dorian Arnold](#), Bronis R De Supinski, Barton P Miller, and Martin Schulz. Benchmarking the Stack Trace Analysis Tool for BlueGene/L. In *Parallel Computing 2007*, pages 621–628, September 2007.
- C20 Phillip C Roth, [Dorian Arnold](#), and Barton P Miller. MRNet: A Software-based Multicast/reduction Network for Scalable Tools. In *IEEE conference on Supercomputing (SC '03)*, page 21, Phoenix, AZ, USA, November 2003. Acceptance rate: 60/207: 29.0%.
- C21 [Dorian Arnold](#), Dieter Bachmann, and Jack Dongarra. Request Sequencing: Optimizing Communication for the Grid. In *6th International Euro-Par Conference – Parallel Processing (Euro-Par 2000)*, pages 1213–1222, Munich, Germany, September 2000a. Springer. Acceptance rate: 167/326: 51.2%.
- C22 [Dorian Arnold](#), Wonsuck Lee, Jack Dongarra, and Mary Wheeler. Providing Infrastructure and Interface to High-performance Applications in a Distributed Setting. In *High Performance Computing 2000*, pages 248–253. Society for Computer Simulation International, 2000d.

Refereed Journal Papers

- J1 [Gutiérrez, Samuel K.](#), Dorian C. Arnold, Kei Davis, and Patrick McCormick. On the Memory Attribution Problem: A Solution and Case Study using MPI. *Concurrency and Computation: Practice and Experience*, February 2019. doi: 10.1002/cpe.5159. URL <https://onlinelibrary.wiley.com/doi/abs/10.1002/cpe.5159>.
- J2 Thomas Herault, Yves Robert, Aurelien Bouteiller, Dorian Arnold, Kurt Ferreira, George Bosilca, and Jack Dongarra. Checkpointing Strategies for Shared High-Performance Computing Platforms. *International Journal of Networking and Computing*, 9(1):28–52, 2019. ISSN 2185-2847. URL <http://ijnc.org/index.php/ijnc/article/view/195>.
- J3 [Taylor L. Groves](#), Ryan E. Grant, [Aaron Gonzales](#), and [Dorian Arnold](#). Unraveling Network-Induced Memory Contention: Deeper Insights with Machine Learning. *IEEE Transactions on Parallel and Distributed Systems*, 29(8):1907–1922, August 2018. ISSN 1045-9219. doi: 10.1109/TPDS.2017.2773483.
- J4 [Ke Wang](#), [Abhishek Kulkarni](#), Michael Lang, [Dorian Arnold](#), and Ioan Raicu. Exploring the Design Tradeoffs for Extreme-Scale High-Performance Computing System Software. *IEEE Transactions on Parallel and Distributed Systems*, PP(99), 2015. ISSN 1045-9219.
- J5 [Dewan Ibtesham](#), Kurt B. Ferreira, and [Dorian Arnold](#). A checkpoint compression study for high-performance computing systems. *International Journal of High Performance Computing Applications*, 29:387–402, November 2015.
- J6 Kurt B Ferreira, Rolf Riesen, Patrick Bridges, [Dorian Arnold](#), and Ron Brightwell. Accelerating Incremental Checkpointing for Extreme-scale Computing. *Future Generation Computer Systems, Special Issue on Extreme Scale Parallel Architectures and Systems, Cryptography in Cloud Computing and Recent Advances in Parallel and Distributed Systems, ICPADS 2012 Selected Papers*, January 2014b.
- J7 Patrick G Bridges, [Dorian Arnold](#), Kevin T Pedretti, Madhav Suresh, Feng Lu, Peter A Dinda, Russ Joseph, and Jack Lange. Virtual-machine-based Emulation of Future Generation High-performance Computing Systems. *International Journal of High Performance Computing Applications*, 26(2):125–135, 2012.
- J8 [Joshua D Goehner](#), [Dorian Arnold](#), Dong H Ahn, Gregory L Lee, Bronis R de Supinski, Matthew P LeGendre, Bronis P Miller, and Martin Schulz. LIBI : A Framework for Bootstrapping Extreme Scale Software Systems. *Parallel Computing*, October 2012.
- J9 Aroon Nataraj, Allen D Malony, Alan Morris, [Dorian Arnold](#), and Barton P Miller. A Framework for Scalable, Parallel Performance Monitoring. *Concurrency and Computation: Practice and Experience*, 22(6):720–735, 2010. First appeared in the International Workshop on Scalable Tools for High-End Computing (STHEC 2008), Island of Kos, Greece.
- J10 Manish Parashar, Rajeev Muralidhar, Wonsuck Lee, [Dorian Arnold](#), Jack Dongarra, and Mary Wheeler. Enabling Interactive and Collaborative Oil Reservoir Simulations on the Grid. *Concurrency and Computation: Practice and Experience*, 17(11):1387–1414, 2005.
- J11 [Dorian Arnold](#), Henri Casanova, and Jack Dongarra. Innovations of the NetSolve Grid Computing System. *Concurrency and computation: practice and experience*, 14(13-15):1457–1479, 2002.
- J12 Micah Beck, [Dorian Arnold](#), Alessandro Bassi, Fran Berman, Henri Casanova, Jack Dongarra, Terry Moore, Graziano Obertelli, James Plank, Martin Swamy, et al. Middleware for the Use of Storage in Communication. *Parallel Computing*, 28(12):1773–1787, 2002. Also appeared in Third Annual International Workshop on Active Middleware Services.
- J13 [Dorian Arnold](#), Sathish S. Vahdiyar, and Jack J. Dongarra. On the Convergence of Computational and Data Grids. *Parallel Processing Letters*, 11(02n03):187–202, 2001.

Refereed Workshop Papers

- W1 Thomas Hérault, Yves Robert, Aurelien Bouteiller, **Dorian Arnold**, Kurt B. Ferreira, George Bosilca, and Jack J. Dongarra. Optimal cooperative checkpointing for shared high-performance computing platforms. In *2018 IEEE International Parallel and Distributed Processing Symposium Workshops, IPDPS Workshops 2018, Vancouver, BC, Canada, May 21-25, 2018*, pages 803–812, 2018. doi: 10.1109/IPDPSW.2018.00127. URL <https://doi.org/10.1109/IPDPSW.2018.00127>. Best Paper Award in 20th Workshop on Advances in Parallel and Distributed Computational Models (APDCM 2018).
- W2 [Samuel K. Gutiérrez](#), **Dorian Arnold**, Kei Davis, and Patrick McCormick. On the Memory Attribution Problem: A Solution and Case Study Using MPI. In *ExaMPI2017 - Workshop on Exascale MPI 2017*, Denver, CO, USA, November 2017c.
- W3 [Samuel K. Gutiérrez](#), **Dorian Arnold**, Kei Davis, and Patrick McCormick. On the Memory Attribution Problem: A Solution and Case Study Using MPI. In *In Workshop on Exascale MPI 2017 (ExaMPI2017)*, Denver, CO, USA, November 2017b.
- W4 Alireza Goudarzi, **Dorian Arnold**, Darko Stefanovic, Kurt B. Ferreira, and Guy Feldman. A principled approach to hpc event monitoring. In *5th Workshop on Fault Tolerance for HPC at eXtreme Scale (FTXS '15)*, pages 3–10, 2015. ISBN 978-1-4503-3569-0. Best Paper Runner-Up.
- W5 **Dorian Arnold**. Fiesta: A framework for introspective extreme scale tools and applications. In Advanced Scientific Computing Research Machine Learning Workshop, January 2015. Position abstract.
- W6 Kurt Ferreira, Scott Levy, Patrick Widener, and **Dorian Arnold**. Using machine learning to optimize uncoordinated checkpointing performance. In Advanced Scientific Computing Research Machine Learning Workshop, January 2015. Position abstract.
- W7 [Dewan Ibtesham](#), [David DeBonis](#), Kurt Ferreira, and **Dorian Arnold**. Coarse-grained Energy Modeling of Rollback/Recovery Mechanisms. In *The 4th Fault Tolerance for HPC at eXtreme Scale (FTXS 2014)*, June 2014.
- W8 [George Bezerra](#), **Dorian Arnold**, and Stephanie Forrest. Empirical and Theoretical Lower Bounds on Energy Consumption for Networks on Chip. In *Sixth International Workshop on Network on Chip Architectures (NoCArc '13)*, December 2013.
- W9 [Philip Soltero](#), Patrick Bridges, **Dorian Arnold**, and Michael Lang. A Gossip-based Approach to Exascale System Services. In *International Workshop on Runtime and Operating Systems for Supercomputers (ROSS 2013)*, page 3, Eugene, Oregon, U.S.A., June 2013. ACM.
- W10 Patrick Widener, Kurt Brian Ferreira, Scott N Levy, Ronald B Brightwell, Patrick G Bridges, and **Dorian Arnold**. Asking the Right Questions: Benchmarking Fault-tolerant Extreme-scale Systems. 6th Workshop on Resiliency in High Performance Computing (Resilience) in Clusters, Clouds, and Grids, August 2013.
- W11 Kurt B Ferreira, Rolf Riesen, **Dorian Arnold**, [Dewan Ibtesham](#), and Ron Brightwell. The Viability of Using Compression to Decrease Message Log Sizes. In *Euro-Par 2012: Parallel Processing Workshops*, 2013a.
- W12 [Scott Levy](#), [Bryan Topp](#), Kurt Ferreira, **Dorian Arnold**, Torsten Hoefler, and Patrick Widener. Using Simulation to Evaluate the Performance of Resilience Strategies at Scale. In *4th International Workshop on Performance Modeling, Benchmarking and Simulation of High Performance Computer Systems (PMBS13)*, November 2013.
- W13 Yihua He [Taylor L. Groves](#) and **Dorian Arnold**. In-network, Push-based Network Resource Monitoring. In *3rd IEEE/ACM International Workshop on Network-aware Data Management (NDM 2013)*, November 2013.
- W14 Barton P. Miller, **Dorian Arnold** Michael J. Brim, Philip C. Roth, Evan Samanas, Benjamin Welton, and Bill Williams. Building on Lessons Learned From Over a Decade of MRNet Research and Development. In *Extreme Scale Programming Tools Workshop*, November 2013.

- W15 Jon Stearley, Kurt B Ferreira, David J Robinson, Jim Laros, Kevin T Pedretti, **Dorian Arnold**, Patrick G Bridges, and Rolf Riesen. Does Partial Replication Pay Off? In IEEE/IFIP 42nd International Conference on Dependable Systems and Networks Workshops (DSN-W), 2012.
- W16 Kurt B Ferreira, Rolf Riesen, **Dorian Arnold**, [Dewan Ibtesham](#), and Ron Brightwell. The Viability of Using Compression to Decrease Message Log Sizes. In 5th Workshop on Resiliency in High Performance Computing in Clusters, Clouds, and Grids (Resilience), August 2012.
- W17 Scott Levy, Kurt Ferreira, Patrick Bridges, **Dorian Arnold**, and David Fiala. Exploiting content similarity to improve memory performance in exascale systems. In Workshop on Exascale Operating Systems and Runtime Software, October 2012. Short abstract.
- W18 **Dorian Arnold**, Patrick G Bridges, Kurt B Ferreira, David K Lowenthal, and Martin Schulz. Run-time support for intergrated power and resilience management. In Workshop on Exascale Operating Systems and Runtime Software, October 2012. Short abstract.
- W19 Patrick G Bridges, **Dorian Arnold**, and Kevin Pedretti. VM-based Slack Emulation of Large-scale Systems. In 1st International Workshop on Runtime and Operating Systems for Supercomputers, 2011.
- W20 [Roy Keyes](#), **Dorian Arnold**, Amy Reynaud, and Shuang Luan. McCloud: Toward 10 Million Monte Carlo Primaries in 5 Minutes for Clinical Use. In *The 53rd Annual Meeting of American Association of Physicists in Medicine (AAPM)*, 2011. Refereed abstract and poster presentation.
- W21 [Roy Keyes](#), [Cristian Romano](#), **Dorian Arnold**, and Shuang Luan. Medical Physics Calculations in the Cloud: A New Paradigm for Clinical Computing. In *The 52nd Annual Meeting of American Association of Physicists in Medicine (AAPM)*, 2010. Refereed abstract and poster presentation.
- W22 **Dorian Arnold**, Gary D Pack, and Barton P. Miller. Tree-based Computing for Scalable Applications. In 11th International Workshop on High-Level Parallel Programming Models and Supportive Environments, 2006.
- W23 Philip C Roth, **Dorian Arnold**, and Barton P Miller. Benchmarking the MRNet Distributed Tool Infrastructure: Lessons Learned. In 18th International Parallel and Distributed Processing Symposium, 2004.
- W24 **Dorian Arnold** and Jack J. Dongarra. Developing an Architecture to Support the Implementation and Development of Scientific Computing Applications. *The Architecture of Scientific Software (IFIP TC2/WG2.5)*, 60:39–55, October 2001.
- W25 Shirley Moore, **Dorian Arnold**, and David Cronk. Metacomputing Support for the SARA3D Structural Acoustics Application. In *DoD Users' Group Conference*, Biloxi, MS, USA, June 2001.
- W26 David Cronk, Graham E Fagg, Brett D Ellis, and **Dorian Arnold**. Metacomputing: An Evaluation of Emerging Systems. Technical Report TR/00-17, U.S. Army Engineer Research and Development Center Major Shared Resource Center, April 2000.
- W27 **Dorian Arnold**, Susan Blackford, Jack Dongarra, Victor Eijkhout, and Tinghua Xu. Seamless Access to Adaptive Solver Algorithms. In *SGI Users' Conference (Also in 16th IMACS WORLD CONGRESS 2000 on Scientific Computation, Applied Mathematics and Simulation Aug. 2000)*, pages 23–30, 2000b.
- W28 **Dorian Arnold**, Shirley Browne, Jack Dongarra, Graham Fagg, and Keith Moore. Secure Remote Access to Numerical Software and Computational Hardware. In *DoD High-Performance Computing Modernization Program Users Group Conference*, 2000c.
- W29 **Dorian Arnold** and Jack Dongarra. The Netsolve Environment: Progressing Towards the Seamless Grid. In 2000 International Workshops on Parallel Processing, 2000.

Book Chapters

- B1 Mary F Wheeler, Wonsuck Lee, Clint N Dawson, **Dorian Arnold**, Tahsin Kurc, Manish Parashar, Joel Saltz, and Alan Sussman. *Parallel Computing in Environment and Energy*, chapter 6, pages 145–165. Morgan Kaufmann Publishers Inc., 2003.

- B2 Geoffrey Fox, Jack Dongarra, **Dorian Arnold**, Henri Casanova, Ann Christine Catlin, Tomasz Haupt, Elias Houstis, and John R Rice. *Problem-solving Environments*, chapter 14, pages 409–442. Morgan Kaufmann Publishers Inc., 2003.

Other Technical Reports

- T1 Kurt Brian Ferreira, Kevin Pedretti, **Dorian Arnold**, Scott N Levy, and Patrick Bridges. Protect Yourself: Why Your OS Must Protect Against DRAM Failures. Technical report, Sandia National Laboratories, 2013b.
- T2 **Dorian Arnold**. *Reliable, Scalable Tree-based Overlay Networks*. PhD thesis, University of Wisconsin–Madison, December 2008.
- T3 **Dorian Arnold**, Sudesh Agrawal, Susan Blackford, Jack Dongarra, Christoph Fabianek, Tomo Hiroyasu, Eric Meek, Michelle Miller, Kiran Sagi, Keith Seymour, et al. User’s Guide to NetSolve V2.0. Technical report, University of Tennessee, 2004.

Patents Granted

- T4 **Keyes, Roy William, Romano, Christian**, Shuang Luan, and **Dorian Arnold**. System and Methods for Performing Medical Physics Calculation, October 2017. US Patent 9805170.

Invited Presentations and Panels

Keynote and Plenary Talks

- 2019 **Keynote**: "Network and Communication Advances for 'Big' Applications, Data & Systems", Scalable Networks for Advanced Computing Workshop, Rio de Janeiro, Brazil, May 2019.
Plenary: "Strategies for Human-Human Interaction", Moderator and Panelist, CRA URMD Grad Cohort Workshop, Waikoloa, HI, March 2019.
- 2018 **Plenary**: "Strategies for Human-Human Interaction", Panel Moderator, CRA URMD Grad Cohort Workshop, San Diego, CA, March 2018.
- 2017 **Plenary**: General Chair Address, 2017 Tapia Conference, Atlanta, GA, USA, September 2017.
- 2016 **Plenary**: Program Chair Address, 2016 Tapia Conference, Austin TX, September 2016.

Technical and Professional Presentations

- 2019 "Emerging HPC Networking Technologies and Adaptive Parallel Programming Environments", Clemson University, Clemson, SC, USA, October 2019.
"Overcoming Workplace Challenges: Trials, Tribulations, and Triumphs", Panel, 2019 Tapia Conference, San Diego, CA, USA, September 2019.
"Adaptive Parallelism for Coupled, Multithreaded Message-Passing Programs", 14th Scheduling for Large Scale Systems Workshop, Bordeaux, France, June 2019.
"Big Deal, Little Deal or No Deal? Perspectives on the HPC Resilience Challenge", SOS 23 Workshop, Asheville, NC, March 2019.
"Publishing Your Research", Co-Presenter, CRA URMD Grad Cohort Workshop, Waikoloa, HI, March 2019.
- 2018 "Big Deal, Little Deal or No Deal? The Realities of the HPC Resilience Challenge", Workshop on Clusters, Clouds, and Data for Scientific Computing, Lyon, France, September 2018.
"Recent Ventures in Emerging HPC Networking Technologies and Adaptive Parallel Programming Environments", Cray Tech Talk, Bloomington, MN, August 2018.
"Preparing Your Thesis Proposal and Becoming a Ph.D. Candidate", Co-Presenter, CRA URMD Grad Cohort Workshop, San Diego, CA, March 2018.
- 2017 "Silent Errors in HPC Systems", Panel, SC17, Denver, CO, USA, November 2017.
"Professional Networks and Collaborations", Early Career Program, SC17, Denver, CO, USA, November 2017.
"Professional Path and Lessons Learned", HPC for Undergraduates Program, SC17, Denver, CO, USA, November 2017.

- "A Resource Management Proposition for Applications, Tools and Services on Extreme Scale Platforms", 12th Scheduling for Large Scale Systems Workshop, Knoxville TN, May 2017.
- "The SMURFS Project: Simulation and Modeling for Understanding Resilience and Faults at Scale", University of Tennessee, Knoxville, TN, USA, March 2017.
- "The SMURFS Project: Simulation and Modeling for Understanding Resilience and Faults at Scale", Washington University, St. Louis, MO, USA, March 2017.
- "The SMURFS Project: Simulation and Modeling for Understanding Resilience and Faults at Scale", Emory University, Atlanta, GA, USA, February, 2017.
- 2016 "An Overview of My Research Projects", Innovative Computing Lab Retreat, Maryville, TN, USA, August 2016.
- Students@SC Program Orientation, Salt Lake City UT, November 2016.
- 2015 "A Non-checkpoint/restart, Non-algorithm-specific Approach to Fault-tolerance", Sandia National Laboratory, Livermore CA
- Students@SC Program Orientation, Austin TX, November 2015.
- 2014 "A Simulation-based Framework for Evaluating Resilience Strategies at Scale", University of Utah, Salt Lake City, UT, USA, October, 2014.
- "A Non-checkpoint/restart, Non-algorithm-specific Approach to Fault-tolerance", Dagstuhl Seminar on Resilience in Exascale Computing, Schloss Dagstuhl, Germany, September 2014
- "Scalable Middleware and Tools for HPC", New Mexico State University, Las Cruces NM, USA, September 2014.
- "Scalable Middleware and Tools for HPC", University of Texas at El Paso, El Paso TX, USA, September 2014.
- "Toward Exascale Tool Infrastructure", Petascale Tools Workshop, Madison WI, August 2014.
- "Toward HPC Runtimes that Self-adapt to your Math", Institute for Computational and Experimental Research in Mathematics, Brown University, Providence, RI, USA, July 2014.
- "A simulation-based framework for evaluating applications at scale", Cray Computing Seminar, Cray Inc., St. Paul, MN, USA, July 2014.
- "A Simulation-based Framework for Evaluating Resilience Strategies at Scale", University of Tennessee, Knoxville, TN, USA, April 2014.
- "A Non-checkpoint/restart, Non-algorithm-specific Approach to Fault-tolerance", Sandia National Laboratories, Livermore, CA, USA, January 2014
- 2013 "Current and Planned LIBI Developments", Petascale Tools Workshop, University of Wisconsin, Madison, WI, USA, July 2013.
- "An Optimal Algorithm for Extreme Scale Job Launch", Paradyn/HTCondor Week, University of Wisconsin, Madison, WI, USA, April 2013.
- 2012 "A (Brief) LIBI Update and Other MRNet-related Stuff", Performance Tools for Extreme-scale Computing, Snowbird, Utah, USA, June 2012.
- 2011 "On the Viability of Checkpoint Compression for Extreme Scale Fault Tolerance", Workshop on Resiliency in High-Performance Computing in Clusters, Clouds, and Grids (Resilience 2011), Bordeaux, France, September 2011.
- "LIBI Status Update and Future Directions", Performance Tools for Extreme Scale Computing, Tahoe City, CA, USA, August 2011.
- "A Framework for Bootstrapping Extreme Scale Software Systems", Workshop on High-performance Infrastructure for Scalable Tools (WHIST), Tucson, AZ, USA, June 2011.
- "LIBI: The Lightweight Infrastructure-Bootstrapping Infrastructure", Paradyn/Condor Week, University of Wisconsin, Madison, WI, USA, May 2011.
- 2010 "Improving Tool Startup and Runtime Performance", Workshop on Performance Tools for Petascale Computing, Snowbird UT, USA, August 2010

- "Toward (More) Scalable, Autonomous Tool Infrastructure", Program Development for Extreme-Scale Computing, Dagstuhl Seminar, Schloss Dagstuhl, Germany, May 2010.
- 2009 "Autonomous Tool Infrastructure", Workshop on Performance Tools for Petascale Computing, Tahoe City, CA, USA, July 2009.

Pre-2009 Talks on High-Performance Computing Middleware and Tools

- 2008 Performance Tools for Petascale Computing, Snowbird UT, July 2008
Paradyn/Condor Week, University of Wisconsin, April 2008.
- 2007 SC PhD Showcase, Reno Nevada, November 2007.
Paradyn/Condor Week, University of Wisconsin, March 2007.
- 2006 Portland State University, October, 2006.
Lawrence Livermore National Laboratory, September 2006.
Petascale Tools Strategy Workshop, IBM T.J. Watson, May 2006.
Oak Ridge National Laboratory, April 2006.
University of Tennessee, April 2006.
Paradyn/Dyninst Week, University of Maryland, March 2006.
- 2005 Automated Performance Analysis, Dagstuhl, Germany, December 2005.
Petascale Tools Strategy Workshop, IBM T.J. Watson, May 2005.
Paradyn/Condor Week, University of Wisconsin, March 2005.
- 2004 Paradyn/Condor Week, University of Wisconsin, April 2004.
- 2003 Dyninst/Paradyn Week, University of Maryland, April 2003.
- 2002 Paradyn/Condor Week, University of Wisconsin, March 2002.

Pre-2002 Talks on Grid Computing

- 2001 NPACI All-Hands Meeting, UCSD, March 2001. (Poster/Demo.)
- 2000 BBN Technologies, Mystic, Connecticut, December 2000.
Clusters and Grids for Scientific Computing, Lyon, France, September 2000.
Geographic Services Workshop, Greenbelt, MD, May 2000.
NPACI All Hands Meeting, UCSD, February 2000. (Poster/Demo.)
- 1999 Center for Sub-surface Modeling, Austin, Texas, October 1999.
University of Tennessee, Knoxville, April 1999.
SC, Dallas, Texas, November 2000. (Poster/Demo.)
SC, Portland, Oregon, November 1999. (Poster/Demo.)
NCSA Chautauqua, Boston University, September 1999. (Poster/Demo.)

External Funding

Funding Statistics

- \$13.1M **Total project budget**, amongst collaborating institutions.
- \$3.7M **Total University budget**.
- \$3.2M **Total University budget committed to Dorian Arnold**.
- \$2.6M **Total University budget with Dorian Arnold as principal investigator**.

Active Funding

- \$884K **Cray Inc.**, *Cray Software Testing Partnership (A Perrenial Partnership)*, September 2017 – August 2020, **Dorian Arnold**, Principal Investigator.
Emory budget: \$884K; Arnold budget: \$884K;
- \$884K **National Science Foundation**, *SHF: Medium: Collaborative Research: Toward Extreme Scale Fault-Tolerance: Exploration Methods, Comparative Studies and Decision Processes*, August 2016 – August 2020, **Dorian Arnold**, Lead Principal Investigator.
Emory budget: \$354K; Arnold budget: \$354K. (Project transferred from UNM to Emory.)

Previously-ended Funding

- \$7.5M **Department of Energy, Hobbes: OS and Runtime Support for Application Composition**, October 2013 – November 2017, Patrick Bridges, UNM Principal Investigator; **Dorian Arnold**, co-Principal Investigator.
UNM budget: \$450K; Arnold budget: \$225K
- \$800K **Cray Inc., Cray Software Testing Partnership (A Perrenial Partnership)**, May 2014 – August 2017, **Dorian Arnold**, Principal Investigator.
UNM budget: \$800K; Arnold budget: \$800K;
- \$96K **Los Alamos National Laboratory, Exascale Resource Monitoring Tools and Workloads**, **Dorian Arnold**, Principal Investigator, February 2015 – June 2017.
UNM budget: \$96K; Arnold budget: \$92K;
- \$29K **Computing Research Association, The HPC Pipeline Workshop: Diversifying the HPC Workforce**, **Dorian Arnold**, Principal Investigator, August 2016 – March 2017.
UNM budget: \$29K; Arnold budget: \$29K;
- \$2.4M **Department of Energy, Enabling Exascale Hardware and Software Design through Scalable System Virtualization**, October, 2010 - February, 2014, Patrick Bridges, UNM Principal Investigator, **Dorian Arnold**, co-Principal Investigator.
UNM budget: \$625K; Arnold budget: \$312K
- \$104K **Los Alamos National Laboratory, Ultrascale Research Center Resilient System Software**, August, 2011 - September, 2013, **Dorian Arnold**, Principal Investigator.
UNM budget: \$104K; Arnold budget: \$104K;
- \$103K **RNET Technologies, Inc., Power Management in MPI Implementations**, January 2014 – August 2014, Patrick Bridges, Principal Investigator; **Dorian Arnold**, co-Principal Investigator.
UNM budget: \$103K; Arnold budget: \$51.5K
- \$75K **Sandia National Laboratory, Extreme Scale Checkpointing**, March, 2012 – September, 2012, **Dorian Arnold**, Principal Investigator.
UNM budget: \$75K; Arnold budget: \$75K;
- \$66K **Lawrence Livermore National Laboratory, Improving Tool Startup**, March, 2013 – April, 2014, **Dorian Arnold**, Principal Investigator.
UNM budget: \$66K; Arnold budget: \$66K;
- \$65K **Lawrence Livermore National Laboratory, Toward Autonomous Tool Infrastructure: Improving MRNet for TLCC Environments**, October, 2011 - March, 2013, **Dorian Arnold**, Principal Investigator.
UNM budget: \$65K; Arnold budget: \$65K;
- \$65K **Lawrence Livermore National Laboratory, MRNet/STAT Advancements for the Common Computing Environment TLCC Systems**, April, 2010 - December, 2010, **Dorian Arnold**, Principal Investigator.
UNM budget: \$65K; Arnold budget: \$65K;
- \$62K **Sandia National Laboratories, Extreme Scale Application Resilience**, January, 2013 – March, 2014, **Dorian Arnold**, Principal Investigator.
UNM budget: \$62K; Arnold budget: \$62K;
- \$52K **Sandia National Laboratory, A Study of the Impact of Checkpoint Models on Application Performance**, May, 2010 – September, 2011, **Dorian Arnold**, Principal Investigator.
UNM budget: \$52K; Arnold budget: \$52K;
- \$11K **National Science Foundation, PACT 2009 Student Travel Scholarships**, August, 2009 - July, 2010, **Dorian Arnold**, Principal Investigator.

Hardware Contributions

- \$663 **NVIDIA Corporation, One (1) Nvidia Tesla c2075 Computing Processor via The NVIDIA University Partnership Program**, July 2012, **Dorian Arnold**, Principal Investigator.

Teaching

- Practicum **Emory-CS 370: Computer Science Practicum**, f19, f18, f17.
Adv. Systems **Emory-CS 559: Distributed Processing**, s18.
UNM-CS 587: Advanced Operating Systems, f16, f14, f13, f11, f10.
UNM-CS 591: Autonomic Computing, f12.
UNM-CS 591: Extreme Scale Computing, s10.
Op. Systems **UNM-CS 481: Operating Systems Principles**, s17, s16, s15, s14, s13, s11, s09.
Comp. Org. **UNM-CS 341: Introduction to Computer Organization**, s15, s12.

Research Advisement

Research Staff

- Since 2014 Evan Dye, Software Engineer.
Since 2018 Douglas Obrecht, Software Engineer.

Students

- Since 2019 Theodore "Alex" Evans, 1st year Ph.D. Student
Since 2019 Esteban Ramos, Senior B.S. Student
Since 2013 Whit Schonbein, Ph.D. Candidate (University of New Mexico)

Alumni

- PhD 2018 Samuel Gutierrez, Los Alamos National Laboratory
PhD 2017 Dewan Ibtesham, Amazon
PhD 2017 Taylor Groves, Lawrence Berkeley National Laboratory
M.S. 2017 Hans Weeks, 84.51°
M.S. 2016 Aaron Gonzales, TripAdvisor
M.S. 2015 Beverly Klemme, Intel Inc.
M.S. 2014 Bryan Topp
M.S. 2014 Lucille Frey, Los Alamos National Laboratory
M.S. 2013 Zhenjie Chen, Bloomberg, Inc.
M.S. 2011 Joshua Goehner, Rogue Wave Software, Inc. (Graduated with distinction)
M.S. 2009 Samuel Gutierrez, Los Alamos National Laboratory
B.S. 2018 Yuan Li
B.S. 2018 Scott Weitzner
B.S. 2017 Theodore (Alex) Evans.
B.S. 2010 Christian Romano, co-advised w/ Prof. Shuang Luan.

Other Research Advisement

- Summer 2013 Alireza Goudarzi, summer internship co-advised with Darko Stefanovic.
Summer 2012 Julian Apodaca, UNM STEP Program
Summer 2012 Zachary Falgout, UNM STEP Program
Summer 2011 Nelson Burgos, Summer DREU Program
Summer 2011 Jonathan Stoppani, co-advised w/ Prof. Patrick Bridges
2011 – 2012 George Bezerra, co-advised HPC research w/ Prof. Stephanie Forrest

Professional Service and Activities

SC ⇒ International Conference on High Performance Computing, Networking, Storage and Analysis

Distinguished/Leadership Activities

- ACM Distinguished Speaker, Association for Computing Machinery, 2017–2020
- Cluster Track Chair, Programming and System Software, IEEE Cluster, 2019
- Emory Director, Computer Science and Informatics Graduate Program, Emory University, 2018–
- ICPP Co-Vice Chair, Systems Track, International Conference on Parallel Processing, 2017
- IEEE Senior member, Institute of Electrical and Electronics Engineers, 2014-present
- IEEE-TPDS Associate Editor, IEEE Transactions on Parallel and Distributed Systems, 2015-2019
- HPC Pipeline Founder/Co-Chair, The HPC Pipeline Workshop: Diversifying the HPC Workforce, 2017
- PACT Finance Chair, Parallel Architectures and Compilation Techniques, 2009
- SC Executive Committee, SC Conference, 2018
- SC Chair, Student Programs, SC Conference, 2018
- SC Steering Committee, SC Conference, 2017
- SC Chair, Early Career Program, SC Conference, 2017
- SC Vice/Deputy Chair, Student Programs, SC Conference, 2015-2017
- SC Vice Chair, Technical Posters, SC, 2015
- SC Co/Deputy Chair, Birds-of-a-Feather (BoFs), SC, 2013, 2014
- SC Sessions Chair, Broader Engagement Program, 2010
- SNACS Steering Committee, Workshop on Scalable Networks for Advanced Computing Systems, 2019
- Tapia General Chair, ACM Richard Tapia Celebration of Diversity in Computing, 2017
- Tapia Program Chair, ACM Richard Tapia Celebration of Diversity in Computing, 2016
- Tapia Chair, Panels & Workshop, ACM Richard Tapia Celebration of Diversity in Computing, 2015
- XSEDE Faculty Council, The Extreme Science and Engineering Discovery Environment, 2012-2014

Technical Program Committees

- ASPLOS- Student Research Competition, ACM International Conference on Architectural Support for
- SRC Programming Languages and Operating Systems, 2018
- Cluster IEEE Cluster, 2015
- CCGrid IEEE/ACM Intl. Symposium on Cluster, Cloud and Grid Computing, 2014, 2015
- ESPAS First Intl. Workshop on Extreme Scale Parallel Architectures and Systems, 2012
- ESPT Workshop on Extreme-Scale Programming Tools, 2018
- FTS International Workshop on Fault Tolerant Systems, 2018
- HiPC IEEE Intl. Conference on High Performance Computing, 2011, 2012
- HIPS Workshop on High-level Parallel Programming Models and Supportive Environments, 2013
- HPCC IEEE Intl. Conf. on High Performance Computing and Communications, 2009, 2011, 2012
- ICA3PP Intl. Conference on Algorithms and Architectures for Parallel Processing, 2012
- ICDCS IEEE International Conference on Distributed Computing Systems, 2017
- ICPP Intl. Conference on Parallel Processing, 2012
- ICS Intl. Conference on Supercomputing, 2011
- IPDPS IEEE Intl. Parallel & Distributed Processing Symposium, 2014, 2018
- ISPA IEEE Intl. Symposium on Parallel and Distributed Processing with Applications, 2013
- ISPASS IEEE International Symposium on Performance Analysis of Systems and Software, 2017
- iWAPT Intl. Workshop on Automatic Performance Tuning, 2009
- PACT Intl. Conference on Parallel Architectures and Compilation Techniques, 2012, 2015
- Resilience Workshop on Resiliency in HPC in Clusters, Clouds, and Grids, 2015, 2016, 2017
- SBAC-PAD Symposium on Computer Architecture and High Performance Computing, 2009, 2011

- SC Intl. Conf. on High Performance Computing, Networking, Storage and Analysis, 2011-2017
- Tapia ACM Richard Tapia Celebration of Diversity in Computing, 2015, 2016
- WHIST Intl. Workshop on High-performance Infrastructure for Scalable Tools, 2011, 2012
- WoC International Workshop on Container Technologies and Container Clouds, 2015

Other Peer Reviewing Activities

- DSN The Intl. Conference on Dependable Systems and Networks, 2004, 2006
- IEEE-TC IEEE Transactions on Computers, 2013
- IEEE-TNSM IEEE Transactions on Network and Service Management, 2009
- Euro-Par Intl. European Conference on Parallel and Distributed Computing, 2002
- EuroPVM/MPI European PVM/MPI Users' Group Meeting, 2002, 2005
- JPDC Journal of Parallel and Distributed Computing, 2011
- PACT Parallel Architectures and Compilation Techniques, 2009
- ParCo Journal of Parallel Computing, 2011
- PDP Eleventh Euromicro Conference Parallel, Distributed and Network-Based Processing, 2003
- SC Intl. Conference on High Performance Computing, Networking, Storage and Analysis, 2007

Grant Proposal Review Panels

- DOE-SBIR U.S. Dept. of Energy Office of Science Adv. Scientific Computing Research (SBIR), 2015
- DOE-WF U.S. Dept. of Energy Office of Science Adv. Scientific Computing Research (Workflows), 2014
- NSF-CCF National Science Foundation Comp. and Comm. Foundations (CCF), 2010, 2012, 2017
- NSF-CSR National Science Foundation Computing Systems Research (CSR), 2012
- NSF-CRI National Science Foundation CISE Research Infrastructure (CRI), 2010, 2013
- NSF-SDCI National Science Foundation Software Development for Cyberinfrastructure (SDCI), 2010
- NSF-SI2 National Science Foundation Software Infrastructure for Sustained Innovation (SI2), 2013

University Service Activities

- Emory-LGS Director of Graduate Studies, Computer Science & Informatics, 2018-present
- Emory-CAS Faculty Senate Executive Council, College of Arts and Science, 2019-present
- Emory-CAS Faculty Senate, College of Arts and Science, 2019-present
- Emory-U Technology Infrastructure and Policy Committee, 2018-present
- Emory-LGS Laney Graduate School STEM Symposium Committee, 2018
- UNM-SOE School of Engineering Dean Search Committee, 2016
- UNM-CARC Center for Advanced Research Computing HPC Systems Engineer 3 Search, 2013

Department Service

- Emory-CS Chair, Computer Science Seminar Series, 2017-present
- Emory-CS Lecturer Search Committee, 2017-2018
- Emory-CS Graduate Admissions Committee, 2017, 2018
- Emory-CS Graduate Recruiting, 2017, 2018
- UNM-CS Chair, Committee for the Promotion of Research, 2015, 2016
- UNM-CS Committee for the Promotion of Research, 2013, 2014
- UNM-CS Chair/co-Chair, Computer Science Colloquium Series, 2011-2014
- UNM-CS Chair, Department Web Presence, 2016
- UNM-CS Lecturer II Search, 2012
- UNM-CS Co-organizer, Graduate Student Visit Day, 2009-2012

Dissertation Committees

- 2016 Scott Levy, University of New Mexico
- Oscar Modragon, University of New Mexico

- 2015 George Saad, University of New Mexico
- 2013 Zheng Cui, University of New Mexico
- 2012 George Bezerra, University of New Mexico
Bilal Shebaro, University of New Mexico
- 2011 Mohammed Al-Saleh, University of New Mexico
Kurt Ferreira, University of New Mexico
Donour Sizemore, University of New Mexico
- 2009 Manjunati Gorentla Venkata, University of New Mexico

Dissertation Proposal Committees

- 2016 Matthew Dosanjh, University of New Mexico
- 2014 Oscar Modragon, University of New Mexico
- 2013 George Saad, University of New Mexico
- 2011 Bilal Shebaro, University of New Mexico
Zheng Cui, University of New Mexico
- 2010 Kurt Ferreira, University of New Mexico

Other Service Activities

Project Evaluator/Judge, New Mexico Supercomputing Challenge, 2009-2011, 2014, 2015
Broader Engagement Committee, Intl. Conference on High Performance Computing, Networking, Storage and Analysis (SC), 2008, 2010-2013