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Peer-reviewed Journal Papers

- [1] Amogh Katti, Giuseppe Di Fatta, Thomas Naughton, and Christian Engelmann. **Epidemic failure detection and consensus for extreme parallelism.** *International Journal of High Performance Computing Applications (IJHPCA)*, 32(5):729–743, September 2018. ISSN 1094-3420. doi: 10.1177/1094342017690910. URL <http://www.christian-engelmann.info/publications/katti17epidemic.pdf>.
- [2] Saurabh Hukerikar and Christian Engelmann. **Resilience design patterns: A structured approach to resilience at extreme scale.** *Journal of Supercomputing Frontiers and Innovations (JSFI)*, 4(3):4–42, October 2017. ISSN 2409-6008. doi: 10.14529/jsfi170301. URL <http://www.christian-engelmann.info/publications/hukerikar17resilience.pdf>.
- [3] Christian Engelmann and Thomas Naughton. **A new deadlock resolution protocol and message matching algorithm for the extreme-scale simulator.** *Concurrency and Computation: Practice and Experience*, 28(12):3369–3389, August 2016. ISSN 1532-0634. doi: 10.1002/cpe.3805. URL <http://www.christian-engelmann.info/publications/engelmann16new.pdf>.
- [4] Marc Snir, Robert W. Wisniewski, Jacob A. Abraham, Sarita V. Adve, Saurabh Bagchi, Pavan Balaji, Jim Belak, Pradip Bose, Franck Cappello, Bill Carlson, Andrew A. Chien, Paul Coteus, Nathan A. Debardeleben, Pedro Diniz, Christian Engelmann, Mattan Erez, Saverio Fazzari, Al Geist, Rinku Gupta, Fred Johnson, Sriram Krishnamoorthy, Sven Leyffer, Dean Liberty, Subhasish Mitra, Todd Munson, Rob Schreiber, Jon Stearley, and Eric Van Hensbergen. **Addressing failures in exascale computing.** *International Journal of High Performance Computing Applications (IJHPCA)*, 28(2):127–171, May 2014. ISSN 1094-3420. doi: 10.1177/1094342014522573. URL <http://www.christian-engelmann.info/publications/snir14addressing.pdf>. 342 citations.
- [5] Christian Engelmann. **Scaling to a million cores and beyond: Using light-weight simulation to understand the challenges ahead on the road to exascale.** *Future Generation Computer Systems (FGCS)*, 30(0):59–65, January 2014. ISSN 0167-739X. doi: 10.1016/j.future.2013.04.014. URL <http://www.christian-engelmann.info/publications/engelmann13scaling.pdf>. 55 citations.
- [6] Chao Wang, Frank Mueller, Christian Engelmann, and Stephen L. Scott. **Proactive process-level live migration and back migration in HPC environments.** *Journal of Parallel and Distributed Computing (JPDC)*, 72(2):254–267, February 2012. ISSN 0743-7315. doi: 10.1016/j.jpdc.2011.10.009. URL <http://www.christian-engelmann.info/publications/wang12proactive.pdf>.
- [7] Stephen L. Scott, Geoffroy R. Vallée, Thomas Naughton, Anand Tikotekar, Christian Engelmann, and Hong H. Ong. **System-level virtualization research at Oak Ridge National Laboratory.** *Future Generation Computer Systems (FGCS)*, 26(3):304–307, March 2010. ISSN 0167-739X. doi: 10.1016/j.future.2009.07.001. URL <http://www.christian-engelmann.info/publications/scott09system.pdf>.
- [8] Xubin (Ben) He, Li Ou, Christian Engelmann, Xin Chen, and Stephen L. Scott. **Symmetric active/active metadata service for high availability parallel file systems.** *Journal of Parallel and Distributed Computing (JPDC)*, 69(12):961–973, December 2009. ISSN 0743-7315. doi: 10.1016/j.jpdc.2009.08.004. URL <http://www.christian-engelmann.info/publications/he09symmetric.pdf>.
- [9] Xubin (Ben) He, Li Ou, Martha J. Kosa, Stephen L. Scott, and Christian Engelmann. **A unified multiple-level cache for high performance cluster storage systems.** *International Journal of High Performance Computing and Networking (IJHPCN)*, 5(1-2):97–109, November 14, 2007. ISSN 1740-0562. doi: 10.1504/IJHPCN.2007.015768. URL <http://www.christian-engelmann.info/publications/he07unified.pdf>.
- [10] Christian Engelmann, Stephen L. Scott, Chokchai (Box) Leangsuksun, and Xubin (Ben) He. **Symmetric active/active high availability for high-performance computing system services.** *Journal of Computers (JCP)*,

1(8):43–54, December 2006. ISSN 1796-203X. doi: 10.4304/jcp.1.8.43-54. URL <http://www.christian-engelmann.info/publications/engelmann06symmetric.pdf>.

- [11] Christian Engelmann, Stephen L. Scott, David E. Bernholdt, Narasimha R. Gottumukkala, Chokchai (Box) Leang-suksun, Jyothish Varma, Chao Wang, Frank Mueller, Aniruddha G. Shet, and Ponnuswamy (Saday) Sadayappan. **MOLAR: Adaptive runtime support for high-end computing operating and runtime systems.** *ACM SIGOPS Operating Systems Review (OSR)*, 40(2):63–72, April 2006. ISSN 0163-5980. doi: 10.1145/1131322.1131337. URL <http://www.christian-engelmann.info/publications/engelmann06molar.pdf>.

Peer-reviewed Conference Papers

- [1] Saurabh Hukerikar and Christian Engelmann. **PLEXUS: A pattern-oriented runtime system architecture for resilient extreme-scale high-performance computing systems.** In *Proceedings of the 25th IEEE Pacific Rim International Symposium on Dependable Computing (PRDC) 2020*, Perth, Australia, December 1-4, 2020. IEEE Computer Society, Los Alamitos, CA, USA. To appear.
- [2] George Ostrouchov, Don Maxwell, Rizwan Ashraf, Christian Engelmann, Mallikarjun Shankar, and James Rogers. **GPU lifetimes on Titan supercomputer: Survival analysis and reliability.** In *Proceedings of the 33rd IEEE/ACM International Conference on High Performance Computing, Networking, Storage and Analysis (SC) 2020*, pages 41:1–14, Atlanta, GA, USA, November 15-20, 2020. ACM Press, New York, NY, USA. ISBN 9781728199986. doi: 10.1109/SC41405.2020.00045. URL <http://www.christian-engelmann.info/publications/ostrouchov20gpu.pdf>. Preliminary acceptance rate 17.9% (68/380).
- [3] Haewon Jeong, Yaoqing Yang, Christian Engelmann, Vipul Gupta, Tze Meng Low, Pulkit Grover, Viveck Cadambe, and Kannan Ramchandran. **3D coded SUMMA: Communication-efficient and robust parallel matrix multiplication.** In *Lecture Notes in Computer Science: Proceedings of the 26th European Conference on Parallel and Distributed Computing (Euro-Par) 2020*, volume 12247, pages 392–407, Warsaw, Poland, August 24–28, 2020. Springer Verlag, Berlin, Germany. ISBN 978-3-030-57674-5. doi: 10.1007/978-3-030-57675-2_25. URL <http://www.christian-engelmann.info/publications/jeong203d.pdf>. Acceptance rate 24.5% (39/159).
- [4] Mohit Kumar, Saurabh Gupta, Tirthak Patel, Michael Wilder, Weisong Shi, Song Fu, Christian Engelmann, and Devesh Tiwari. **Understanding and analyzing interconnect errors and network congestion on a large scale HPC system.** In *Proceedings of the 48th IEEE/IFIP International Conference on Dependable Systems and Networks (DSN) 2018*, pages 107–114, Luxembourg City, Luxembourg, June 25–28, 2018. IEEE Computer Society, Los Alamitos, CA, USA. ISBN 978-1-5386-5596-2. doi: 10.1109/DSN.2018.00023. URL <http://www.christian-engelmann.info/publications/kumar18understanding.pdf>. Acceptance rate 27.2% (62/228).
- [5] Bin Nie, Ji Xue, Saurabh Gupta, Tirthak Patel, Christian Engelmann, Evgenia Smirni, and Devesh Tiwari. **Machine learning models for GPU error prediction in a large scale HPC system.** In *Proceedings of the 48th IEEE/IFIP International Conference on Dependable Systems and Networks (DSN) 2018*, pages 95–106, Luxembourg City, Luxembourg, June 25–28, 2018. IEEE Computer Society, Los Alamitos, CA, USA. ISBN 978-1-5386-5596-2. doi: 10.1109/DSN.2018.00022. URL <http://www.christian-engelmann.info/publications/nie18machine.pdf>. Acceptance rate 27.2% (62/228).
- [6] Rizwan Ashraf, Saurabh Hukerikar, and Christian Engelmann. **Pattern-based modeling of multiresilience solutions for high-performance computing.** In *Proceedings of the 9th ACM/SPEC International Conference on Performance Engineering (ICPE) 2018*, pages 80–87, Berlin, Germany, April 9–13, 2018. ACM Press, New York, NY, USA. ISBN 978-1-4503-5095-2. doi: 10.1145/3184407.3184421. URL <http://www.christian-engelmann.info/publications/ashraf18pattern-based.pdf>. Acceptance rate 23.7% (14/59).
- [7] Rizwan Ashraf, Saurabh Hukerikar, and Christian Engelmann. **Shrink or substitute: Handling process failures in HPC systems using in-situ recovery.** In *Proceedings of the 26th Euromicro International Conference on Parallel, Distributed, and network-based Processing (PDP) 2018*, pages 178–185, Cambridge, UK, March 21–23, 2018. IEEE Computer Society, Los Alamitos, CA, USA. ISBN 978-1-5386-4975-6. doi: 10.1109/PDP2018.2018.00032. URL <http://www.christian-engelmann.info/publications/ashraf18shrink.pdf>. Acceptance rate 29.3% (27/92).
- [8] Saurabh Gupta, Tirthak Patel, Christian Engelmann, and Devesh Tiwari. **Failures in large scale systems: Long-term measurement, analysis, and implications.** In *Proceedings of the 30th IEEE/ACM International Conference on High Performance Computing, Networking, Storage and Analysis (SC) 2017*, pages 44:1–44:12, Denver, CO, USA, November 12–17, 2017. ACM Press, New York, NY, USA. ISBN 978-1-4503-5114-0. doi:

- 10.1145/3126908.3126937. URL <http://www.christian-engelmann.info/publications/gupta17failures.pdf>. Acceptance rate 18.7% (61/327).
- [9] Bin Nie, Ji Xue, Saurabh Gupta, Christian Engelmann, Evgenia Smirni, and Devesh Tiwari. **Characterizing temperature, power, and soft-error behaviors in data center systems: Insights, challenges, and opportunities**. In *Proceedings of the 25th IEEE International Symposium on the Modeling, Analysis, and Simulation of Computer and Telecommunication Systems (MASCOTS) 2017*, pages 22–31, Banff, AB, Canada, September 20–22, 2017. IEEE Computer Society, Los Alamitos, CA, USA. ISBN 978-1-5386-2764-8. doi: 10.1109/MASCOTS.2017.12. URL <http://www.christian-engelmann.info/publications/nie17characterizing.pdf>. Acceptance rate 30.95% (26/84).
- [10] Saurabh Hukerikar and Christian Engelmann. **A pattern language for high-performance computing resilience**. In *Proceedings of the 22nd European Conference on Pattern Languages of Programs (EuroPLoP) 2017*, pages 12:1–12:16, Kloster Irsee, Germany, July 12–16, 2017. ACM Press, New York, NY, USA. ISBN 978-1-4503-4848-5. doi: 10.1145/3147704.3147718. URL <http://www.christian-engelmann.info/publications/hukerikar17pattern.pdf>.
- [11] Mahesh Lagadapati, Frank Mueller, and Christian Engelmann. **Benchmark generation and simulation at extreme scale**. In *Proceedings of the 20th IEEE/ACM International Symposium on Distributed Simulation and Real Time Applications (DS-RT) 2016*, pages 9–18, London, UK, September 21–23, 2016. IEEE Computer Society, Los Alamitos, CA, USA. ISBN 978-1-5090-3506-9. doi: 10.1109/DS-RT.2016.18. URL <http://www.christian-engelmann.info/publications/lagadapati16benchmark.pdf>. Acceptance rate 42.0% (21/50). Best paper candidate.
- [12] Saurabh Hukerikar and Christian Engelmann. **Havens: Explicit reliable memory regions for HPC applications**. In *Proceedings of the 20th IEEE High Performance Extreme Computing Conference (HPEC) 2016*, pages 1–6, Waltham, MA, USA, September 13–15, 2016. IEEE Computer Society, Los Alamitos, CA, USA. doi: 10.1109/HPEC.2016.7761593. URL <http://www.christian-engelmann.info/publications/hukerikar16havens.pdf>.
- [13] Kun Tang, Devesh Tiwari, Saurabh Gupta, Ping Huang, QiQi Lu, Christian Engelmann, and Xubin He. **Power-capping aware checkpointing: On the interplay among power-capping, temperature, reliability, performance, and energy**. In *Proceedings of the 46th IEEE/IFIP International Conference on Dependable Systems and Networks (DSN) 2016*, pages 311–322, Toulouse, France, June 28 - July 1, 2016. IEEE Computer Society, Los Alamitos, CA, USA. doi: 10.1109/DSN.2016.36. URL <http://www.christian-engelmann.info/publications/tang16power-aware.pdf>. Acceptance rate 22.4% (58/259).
- [14] David Fiala, Frank Mueller, Kurt Ferreira, and Christian Engelmann. **Mini-Ckpts: Surviving OS failures in persistent memory**. In *Proceedings of the 30th ACM International Conference on Supercomputing (ICS) 2016*, pages 7:1–7:14, Istanbul, Turkey, June 1–3, 2016. ACM Press, New York, NY, USA. ISBN 978-1-4503-4361-9. doi: 10.1145/2925426.2926295. URL <http://www.christian-engelmann.info/publications/fiala16mini-ckpts.pdf>. Acceptance rate 24.2% (43/178).
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- [16] Christian Engelmann and Thomas Naughton. **Supporting the development of soft-error resilient message passing applications using simulation**. In *Proceedings of the 13th IASTED International Conference on Parallel and Distributed Computing and Networks (PDCN) 2016*, Innsbruck, Austria, February 15–16, 2016. ACTA Press, Calgary, AB, Canada. ISBN 978-0-88986-979-0. doi: 10.2316/P.2016.834-005. URL <http://www.christian-engelmann.info/publications/engelmann16supporting.pdf>.
- [17] Amogh Katti, Giuseppe Di Fatta, Thomas Naughton, and Christian Engelmann. **Scalable and fault tolerant failure detection and consensus**. In *Proceedings of the 22nd European MPI Users' Group Meeting (EuroMPI) 2015*, pages 13:1–13:9, Bordeaux, France, September 21–24, 2015. ACM Press, New York, NY, USA. ISBN 978-1-4503-3795-3. doi: 10.1145/2802658.2802660. URL <http://www.christian-engelmann.info/publications/katti15scalable.pdf>. Acceptance rate 48.3% (14/29).
- [18] Christian Engelmann and Thomas Naughton. **A network contention model for the extreme-scale simulator**. In *Proceedings of the 34th IASTED International Conference on Modelling, Identification and Control (MIC) 2015*, Innsbruck, Austria, February 17–18, 2015. ACTA Press, Calgary, AB, Canada. ISBN 978-0-88986-975-2. doi: 10.2316/P.2015.826-043. URL <http://www.christian-engelmann.info/publications/engelmann15network.pdf>.

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- [21] Geoffroy Vallée, Thomas Naughton, Swen Böhm, and Christian Engelmann. **A runtime environment for supporting research in resilient HPC system software & tools.** In *Proceedings of the 1st International Symposium on Computing and Networking - Across Practical Development and Theoretical Research - (CANDAR) 2013*, pages 213–219, Matsuyama, Japan, December 4–6, 2013. IEEE Computer Society, Los Alamitos, CA, USA. ISBN 978-1-4799-2795-1. doi: 10.1109/CANDAR.2013.38. URL <http://www.christian-engelmann.info/publications/vallee13runtime.pdf>. Acceptance rate 35.8% (28/78).
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- [23] David Fiala, Frank Mueller, Christian Engelmann, Kurt Ferreira, Ron Brightwell, and Rolf Riesen. **Detection and correction of silent data corruption for large-scale high-performance computing.** In *Proceedings of the 25th IEEE/ACM International Conference on High Performance Computing, Networking, Storage and Analysis (SC) 2012*, pages 78:1–78:12, Salt Lake City, UT, USA, November 10–16, 2012. ACM Press, New York, NY, USA. ISBN 978-1-4673-0804-5. doi: 10.1109/SC.2012.49. URL <http://www.christian-engelmann.info/publications/fiala12detection2.pdf>. Acceptance rate 21.2% (100/472). 293 citations.
- [24] James Elliott, Kishor Kharbas, David Fiala, Frank Mueller, Kurt Ferreira, and Christian Engelmann. **Combining partial redundancy and checkpointing for HPC.** In *Proceedings of the 32nd International Conference on Distributed Computing Systems (ICDCS) 2012*, pages 615–626, Macau, SAR, China, June 18–21, 2012. IEEE Computer Society, Los Alamitos, CA, USA. ISBN 978-0-7695-4685-8. doi: 10.1109/ICDCS.2012.56. URL <http://www.christian-engelmann.info/publications/elliott12combining.pdf>. Acceptance rate 13.8% (71/515). 159 citations.
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- [26] Swen Böhm and Christian Engelmann. **File I/O for MPI applications in redundant execution scenarios.** In *Proceedings of the 20th Euromicro International Conference on Parallel, Distributed, and network-based Processing (PDP) 2012*, pages 112–119, Garching, Germany, February 15–17, 2012. IEEE Computer Society, Los Alamitos, CA, USA. ISBN 978-0-7695-4633-9. doi: 10.1109/PDP.2012.22. URL <http://www.christian-engelmann.info/publications/boehm12file.pdf>.
- [27] Swen Böhm and Christian Engelmann. **xSim: The extreme-scale simulator.** In *Proceedings of the International Conference on High Performance Computing and Simulation (HPCS) 2011*, pages 280–286, Istanbul, Turkey, July 4–8, 2011. IEEE Computer Society, Los Alamitos, CA, USA. ISBN 978-1-61284-383-4. doi: 10.1109/HPCSim.2011.5999835. URL <http://www.christian-engelmann.info/publications/boehm11xsim.pdf>. Acceptance rate 28.1% (48/171).
- [28] Christian Engelmann and Swen Böhm. **Redundant execution of HPC applications with MR-MPI.** In *Proceedings of the 10th IASTED International Conference on Parallel and Distributed Computing and Networks (PDCN) 2011*, pages 31–38, Innsbruck, Austria, February 15–17, 2011. ACTA Press, Calgary, AB, Canada.

- ISBN 978-0-88986-864-9. doi: 10.2316/P.2011.719-031. URL <http://www.christian-engelmann.info/publications/engelmann11redundant.pdf>. 64 citations.
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- [31] Swen Böhm, Christian Engelmann, and Stephen L. Scott. **Aggregation of real-time system monitoring data for analyzing large-scale parallel and distributed computing environments**. In *Proceedings of the 12th IEEE International Conference on High Performance Computing and Communications (HPCC) 2010*, pages 72–78, Melbourne, Australia, September 1-3, 2010. IEEE Computer Society, Los Alamitos, CA, USA. ISBN 978-0-7695-4214-0. doi: 10.1109/HPCC.2010.32. URL <http://www.christian-engelmann.info/publications/boehm10aggregation.pdf>. Acceptance rate 19.1% (58/304).
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- [33] Narate Taerat, Nichamon Naksinehaboon, Clayton Chandler, James Elliott, Chokchai (Box) Leangsuksun, George Ostrouchov, Stephen L. Scott, and Christian Engelmann. **Blue Gene/L log analysis and time to interrupt estimation**. In *Proceedings of the 4th International Conference on Availability, Reliability and Security (ARES) 2009*, pages 173–180, Fukuoka, Japan, March 16-19, 2009. IEEE Computer Society, Los Alamitos, CA, USA. ISBN 978-1-4244-3572-2. doi: 10.1109/ARES.2009.105. URL <http://www.christian-engelmann.info/publications/taerat09blue.pdf>. Acceptance rate 25.0% (40/160).
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