Nathan R. Tallent

Chief Computer Scientist
Future Computing Technologies Group
Pacific Northwest National Laboratory
PO Box 999, MSIN J4-30, Richland, WA 99352

tallent@pnnl.gov • 509.372.4206
tallent@alumni.rice.edu
nathantallent.github.io

Research Summary

Dr. Nathan Tallent is a distinguished computer scientist within the Future Computing Technologies Group at Pacific Northwest National Laboratory. His research is motivated by emerging challenges in distributed systems, machine learning, scientific workflows, and data management. He leads activities in continuum computing and the Performance Lab for EXtreme Computing and daTa where his contributions have spanned the challenges of performance measurement, modeling, bottleneck diagnosis, and optimization; and includes special attention to bottlenecks in networks, storage, and memory. He has made notable contributions to performance tools, both for performance modeling and for parallel performance analysis. He has more than 70 peer-reviewed publications, serves on several reviewing committees, and received a DOE Early Career award.

Dr. Tallent is leading ASCR projects on performance prediction and diagnosis for extreme-scale scientific workflows. His work partners with ASCR's AMAIS ("Advanced Memory to Support Artificial Intelligence for Science") and ASCR's ENCODE ("End-to-end co-design for performance, energy efficiency, and security in AI-enabled computational science") project in characterizing workloads, generating performance models, analyzing data movement, diagnosing performance bottlenecks, and evaluating new technology. He has led development of several research software prototypes for distributed scientific workflows, distributed AI services, and performance analysis and prediction. In particular, he leads development of DataFlowDrs, a measurement and analysis toolsets for distributed scientific workflows; and the MemGaze the Palm performance analysis and modeling tools. He led development of the SEAK and PERFECT benchmark suites, designed for evaluating performance-power-architecture tradeoffs. He was an original developer of HPCToolkit, a widely used suite of performance tools.

Education

Ph.D., Computer Science, *Rice University*, Houston, TX — May 2010

M.S., Computer Science, *Rice University*, Houston, TX — May 2007

M.Div., *Westminster Theological Seminary*, Philadelphia, PA — May 2002

B.A., Computer Science, *Rice University*, Houston, TX — May 1998

Selected Work

◇ US DOE Early Career (2021)

◇ ***IPDPS*** 26a, 26b, 26c, 26d; 25a, 25b; 24, 23, 17, 16, 16 • ***SC*** 23, 21, 17, 15, 10, 09 • ***ICS*** 25, 14, 11
CLUSTER 24a, 24b, 18, 22 • ***IISWC*** 20, 18 • ***ISPASS*** 20 • ***PPoPP*** 15, 10, 09
AAAI 26 • ***ICDM*** 25 • ***BigData*** 20, 19 • ***PLDI*** 09
JPDC 23 • ***TPDS*** 21, 20 • ***C&C*** 10 • ***IEEE Computer*** 09

◇ Best paper nominees: ICS '25, SSDBM '25, IISWC '18, SC '15, PLDI '09.

◇ ACM/IEEE-CS George Michael Memorial HPC Fellowship (2009)

Professional Experience

◇ Chief Computer Scientist, Pacific Northwest National Laboratory, Jan. 2022–present.

◇ Senior Computer Scientist, Pacific Northwest National Laboratory, Oct. 2011–2021.

◇ Research Scientist, Dept. of Computer Science, Rice University, Apr. 2010–Oct. 2011.

◇ Performance Tools Consultant (Samara Technology Group, SiCortex), Jan. 2007–Mar. 2011.

Professional Leadership

- ◇ PI, DOE ASCR (Early Career) "Orchestration for Distributed and Data-Intensive Scientific Exploration," 2021-2026.

- ◇ Co-PI, AT SCALE (LDRD) "Data-Intensive Scientific Exploration", 2024-25.

- ◇ Chief Scientist, PNNL Agile investment "Cloud, HPC, and Edge for Science and Security" (CHESS), 2022-24.

- ◇ Co-PI, DMC (LDRD) "Fixing Amdahl's Law within the Limits of Accelerated Systems" (Fallacy), 2019-22.

- ◇ PI, DOE ASCR "Integrated End-to-end Performance Prediction and Diagnosis for Extreme Scientific Workflows" (IPPD/2), 2017-2020.

- ◇ Co-PI, DOE ASCR "Performance Insight for Programmers and Exascale Runtimes" (PIPER), 2012-16.

- ◇ Chair of Performance track, ICPP 2024 (53rd International Conference on Parallel Processing

- ◇ Chair of Performance Modeling, Evaluation, and Analysis Track, ISC 2022 (Intl. Supercomputing Conf.) 2022.

- ◇ Co-Organizer, Workshop on Principles of Memory Hierarchy Optimization, in conjunction with PPoPP (Principles and Practice of Parallel Programming) 2022.

- ◇ Workshop/Tutorial Chair, IEEE International Symposium on Workload Characterization 2022.

- ◇ Co-chair, Performance Track, SC (Intl. Conf. for High Performance Computing, Networking, Storage and Analysis), 2019.

- ◇ Co-Organizer, Workshop on Suite of Embedded Applications and Kernels, in conjunction with DAC (Design Automation Conf.) 2015.

- ◇ Co-Organizer, The Second Intl. Workshop on High-performance Infrastructure for Scalable Tools, in conjunction with ICS (Intl. Conf. on Supercomputing) 2012.

- ◇ Co-Organizer, The First Intl. Workshop on High-performance Infrastructure for Scalable Tools, in conjunction with ICS (Intl. Conf. on Supercomputing) 2011.

Professional Service

- ◇ Western Washington University, Dept. of Computer Science Advisory Board

- ◇ Program Committee, IEEE/ACM Intl. Conf. for High Performance Computing, Networking, Storage and Analysis, 2026 (SC25)

- ◇ Program Committee, ACM 35rd International Symposium on High-Performance Parallel and Distributed Computing (HPDC 2026)

- ◇ 1st Workshop On Data Reduction And Energy-Aware Data Movement (Dream) SCA 2026

- ◇ Program Committee, 40th IEEE International Parallel and Distributed Processing Symposium (IPDPS 2026)

- ◇ Program Committee, 53rd International Conference on Parallel Processing (ICPP 2025)

- ◇ Program Committee, IEEE/ACM Intl. Conf. for High Performance Computing, Networking, Storage and Analysis, 2025 (SC25)

- ◇ Program Committee, ACM 34rd International Symposium on High-Performance Parallel and Distributed Computing (HPDC 2025)

- ◇ Program Committee, 30th ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming (PPoPP 2025)

- ◇ ACM SIGHPC Doctoral Dissertation Award Committee

- ◇ Program Committee, ACM 33rd International Symposium on High-Performance Parallel and Distributed Computing (HPDC 2024)

- ◇ Program Committee, IEEE/ACM Intl. Conf. for High Performance Computing, Networking, Storage and Analysis, 2024 (SC24)

- ◇ Program Committee, 53rd International Conference on Parallel Processing (ICPP 2024)

⋄ Program Committee, 30th International European Conference on Parallel and Distributed Computing (Euro-PAR 2024)

⋄ Program Committee, 38th IEEE International Parallel and Distributed Processing Symposium (IPDPS'24)

⋄ Program Committee, 29th ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming (PPoPP 2024)

⋄ Program Committee, 10th IEEE/ACM International Conference on Big Data Computing, Applications and Technologies (BDCAT2023)

⋄ Program Committee, 2023 Workshop on Programming and Performance Visualization Tools (ProTools)

⋄ Program Committee, IEEE/ACM Intl. Conf. for High Performance Computing, Networking, Storage and Analysis, 2023 (SC23)

⋄ Program Committee, IEEE 37th Intl. Parallel and Distributed Processing Symp., 2023

⋄ Program Committee, Intl. Supercomputing Conf., 2023

⋄ Program Committee, 37th ACM International Conference on Supercomputing, 2023 (ICS).

⋄ Program Committee, IEEE 37th Intl. Parallel and Distributed Processing Symp., 2023 (IPDPS).

⋄ Program Committee, IEEE/ACM Intl. Conf. for High Performance Computing, Networking, Storage and Analysis, 2022.

⋄ Program Committee, 2022 Workshop on Programming and Performance Visualization Tools (ProTools)

⋄ Program Committee, 51th International Conference on Parallel Processing, 2022.

⋄ Program Committee, IEEE/ACM International Symposium on Cluster, Cloud and Internet Computing, 2022

⋄ Program Committee, IEEE 36th Intl. Parallel and Distributed Processing Symp., 2022

⋄ Program Committee, Supercomputing Frontiers Asia 2022

⋄ 2021 Program Committee, Workshop on Programming and Performance Visualization Tools (ProTools)

⋄ Program Committee, IEEE/ACM Intl. Conf. for High Performance Computing, Networking, Storage and Analysis, 2021.

⋄ Program Committee, 50th International Conference on Parallel Processing, 2021

⋄ Program Committee, IEEE 35th Intl. Parallel and Distributed Processing Symp., 2021

⋄ 2020 Program Committee, Workshop on Programming and Performance Visualization Tools (ProTools)

⋄ Program Committee, Intl. Conf. on Massive Storage Systems and Technology, 2020.

⋄ Program Committee, Supercomputing Asia, 2020.

⋄ Program Committee, IEEE/ACM Intl. Symp. on Cluster, Cloud and Grid Computing, 2020.

⋄ Program Committee, IEEE Cluster Conf., 2019.

⋄ Program Committee, Intl. Conf. on Parallel Processing, 2019.

⋄ Extended Program Committee, ACM/SIGARCH Intl. Conf. on Supercomputing, 2019.

⋄ Program committee, IEEE/ACM Intl. Symp. on Cluster, Cloud and Grid Computing, 2019.

⋄ Program Committee, IEEE/ACM Intl. Conf. for High Performance Computing, Networking, Storage and Analysis, 2018.

⋄ Program Committee, ACM/SIGARCH Intl. Conf. on Supercomputing, 2018.

⋄ Program Committee, IEEE/ACM Intl. Symp. on Cluster, Cloud and Grid Computing, 2018.

⋄ Program Committee, IEEE Cluster Conf., 2018.

⋄ Program Committee, Intl. Conf. on Parallel Processing, 2018.

◇ Program committee, Supercomputing Asia, 2018.

◇ Program Committee, IEEE Cluster Conf., 2017.

◇ Program Committee, IEEE/ACM Intl. Conf. for High Performance Computing, Networking, Storage and Analysis, Nov. 2016.

◇ Program Committee, IEEE/ACM Intl. Symp. on Cluster, Cloud and Grid Computing, 2016.

◇ Program Committee, IEEE 30th Intl. Parallel and Distributed Processing Symp., 2016.

◇ Program Committee, ACM/SIGARCH 29th Intl. Conf. on Supercomputing, 2015.

◇ Program Committee, 15th IEEE/ACM Intl. Symp. on Cluster, Cloud and Grid Computing, 2015.

◇ Program Committee: Fifth Intl. Workshop on Parallel Software Tools and Tool Infrastructures (part of ICPP 2014), 2014.

◇ Program Committee, PROPER 2014: 7th Workshop on Productivity and Performance (part of EuroPar 2014), 2014.

◇ Extended Review Committee, ICS 2014: The ACM/SIGARCH 28th Intl. Conf. on Supercomputing, 2014.

◇ Program Committee, DAC Workshop on Suite of Embedded Applications and Kernels (part of 51st Design Automation Conf.), 2014.

◇ Program Committee, HIPS 2014: 19th Intl. Workshop on High-Level Parallel Programming Models and Supportive Environments (part of IPDPS 2014), 2014.

◇ Birds of a Feather Committee Member, SC 2013: The IEEE/Computer and ACM/SIGARCH 2013 Intl. Conf. for High Performance Computing, Networking, Storage and Analysis, 2013.

◇ Program Committee, PSTI 2013: Fourth Intl. Workshop on Parallel Software Tools and Tool Infrastructures (part of ICPP 2013), Lyon, France, October, 2013.

◇ Program Committee, PROPER 2013: 6th Workshop on Productivity and Performance (part of EuroPar 2013), 2013.

◇ Program Committee, ASPLOS 2013: The ACM 18th Intl. Conf. on Architectural Support for Programming Languages and Operating Systems, 2013.

◇ Program Committee, PPoPP 2013: The ACM/SIGPLAN 18th Symp. on Principles and Practice of Parallel Programming, 2013.

◇ Program Committee, PSTI 2012: Third Intl. Workshop on Parallel Software Tools and Tool Infrastructures (part of ICPP 2012), 2012.

◇ External Review Committee, PPoPP 2012: The ACM/SIGPLAN 17th Symp. on Principles and Practice of Parallel Programming, 2012.

◇ Program Committee, SC 2011: The IEEE/Computer and ACM/SIGARCH 2011 Intl. Conf. for High Performance Computing, Networking, Storage and Analysis, 2011.

◇ Program Committee, PSTI 2011: Second Intl. Workshop on Parallel Software Tools and Tool Infrastructures (part of ICPP 2011), 2011.

◇ Program Committee, ICS 2011: The ACM/SIGARCH 25th Intl. Conf. on Supercomputing, 2011.

◇ Program Committee, CGO 2011: 2011 Intl. Symp. on Code Generation and Optimization, 2011.

◇ Reviewer for *ACM Transactions on Architecture and Code Optimization, ACM Transactions on Parallel Computing, Concurrency and Computation: Practice and Experience, IEE Computer, IEEE Transactions on Computers, IEEE Transactions on Parallel and Distributed Systems, Journal of Systems and Software, Journal of Parallel and Distributed Computing, Parallel Computing: Systems & Applications, Software: Practice and Experience.*

Publications: Distributed AI Systems and Data Analytics

◇ Zhang, Boyuan, **Tallent, Nathan R.** et al. **May 2026**. "Accelerating AI Compression through Lightweight Lossless Encoding and Pipelined Workflows". In: *Proc. of the 40th IEEE Intl. Parallel and Distributed Processing Symp.* IEEE Computer Society.

◇ Li, Boqiang, Guo, Luanzheng, She, Buxin, **Tallent, Nathan R.**, Adetola, Veronica, and Ge, Rong. **May 2026**. "PowerMorph: Shaping LLM Training for Data Center Demand Response". In: *Proc. of the 40th IEEE Intl. Parallel and Distributed Processing Symp.* IEEE Computer Society.

◇ Gong, Chengyu, Shen, Gefei, Guo, Luanzheng, **Tallent, Nathan R.**, and Zhao, Dongfang. **Jan. 2026**. "Order-Preserving Dimension Reduction for Multimodal Semantic Embedding". In: *Proceedings of the AAAI Conference on Artificial Intelligence* 40.

◇ Mehboob, Talha, Guo, Luanzheng, **Tallent, Nathan R.**, Zink, Michael, and Irwin, David. **Nov. 2025**. "PowerTrip: Exploiting Federated Heterogeneous Datacenter Power for Distributed ML Training". In: *Proc. of the 16th ACM Symposium on Cloud Computing*.

◇ Fu, Jiuzhou, Guo, Luanzheng, **Tallent, Nathan R.**, and Zhao, Dongfang. **Nov. 2025**. "ProHD: Projection-Based Hausdorff Distance Approximation". In: *Proc. of the 25th IEEE Intl. Conf. on Data Mining*.

◇ Sun, Minqiu, Huang, Xin, Guo, Luanzheng, **Tallent, Nathan R.**, Sato, Kento, and Dai, Dong. **Nov. 2025**. "LLMTailor: A Layer-wise Tailoring Tool for Efficient Checkpointing of Large Language Models". In: *Proc. of the SC '25 Workshops of the Intl. Conf. for High Performance Computing, Networking, Storage and Analysis (10th Intl Parallel Data Systems Workshop).* New York, NY, USA: Association for Computing Machinery, pp. 1366–1374. DOI: `10.1145/3731599.3767515`.

◇ Faykus III, Max H., Guo, Luanzheng, Ashraf, Rizwan A., **Tallent, Nathan R.**, and Calhoun, Jon C. **June 2025**. "Exploration of LLM Lossless Compression on Scientific Data". In: *IEEE Intl. Workshop on HPC for AI Foundation Models and LLMs for Science (co-located with 39th IEEE Intl. Parallel and Distributed Processing Symp.)* IEEE Computer Society.

◇ Abebe, Waqwoya, Strube, Jan, Guo, Luanzheng, **Tallent, Nathan R.**, Bel, Oceane, Spurgeon, Steven, Doty, Christina, and Jannesari, Ali. **Jan. 2025**. "SAM-I-Am: Semantic boosting for zero-shot atomic-scale electron micrograph segmentation". In: *Computational Materials Science* 246, p. 113400. DOI: `10.1016/j.commatsci.2024.113400`.

◇ Sarkar, Aishwarya, Ghosh, Sayan, **Tallent, Nathan R.**, and Jannesari, Ali. **Sept. 2024**. "MassiveGNN: Efficient Training via Prefetching for Massively Connected Distributed Graphs". In: *Proc. of the 2024 IEEE Conf. on Cluster Computing.* IEEE, pp. 62–73. DOI: `10.1109/CLUSTER59578.2024.00013`.

◇ Chen, Jou-An, Sung, Hsin-Hsuan, Shen, Xipeng, **Tallent, Nathan**, Barker, Kevin, and Li, Ang. **2023e**. "Accelerating matrix-centric graph processing on GPUs through bit-level optimizations". In: *Journal of Parallel and Distributed Computing* 177, pp. 53–67. DOI: `https://doi.org/10.1016/j.jpdc.2023.02.013`.

◇ Chen, Jou-An, Sung, Hsin-Hsuan, **Tallent, Nathan R.**, Barker, Kevin, Shen, Xipeng, and Li, Ang. **May 2022**. "Bit-GraphBLAS: Bit-Level Optimizations of Matrix-Centric Graph Processing on GPU". in: *Proc. of the 36st IEEE Intl. Parallel and Distributed Processing Symp.* IEEE. DOI: `10.1109/IPDPS53621.2022.00056`.

◇ Li, Ang, Song, S., Chen, J., Li, J., Liu, X., **Tallent, Nathan**, and Barker, Kevin J. **Jan. 2020**. "Evaluating Modern GPU Interconnect: PCIe, NVLink, NV-SLI, NVSwitch and GPUDirect". In: *IEEE Transactions on Parallel and Distributed Systems* 31.1, pp. 94–110. DOI: `10.1109/TPDS.2019.2928289`.

◇ Li, Ang, Song, Shuaiwen Leon, Liu, Xu, **Tallent, Nathan**, and Barker, Kevin. **Sept. 2018**. "Tartan: Evaluating Modern GPU Interconnect via a Multi-GPU Benchmark Suite". In: *Proc. of the 2018 IEEE Intl. Symp. on Workload Characterization.* **Best Paper Finalist**, pp. 191–202. DOI: `10.1109/IISWC.2018.8573483`.

◇ **Tallent, Nathan R.**, Gawande, Nitin A., Siegel, Charles, Vishnu, Abhinav, and Hoisie, Adolfy. **Dec. 2017**. "Evaluating On-Node GPU Interconnects for Deep Learning Workloads". In: *High Performance Computing Systems. Performance Modeling, Benchmarking, and Simulation.* Ed. by Stephen Jarvis, Steven Wright, and Simon Hammond. Springer International Publishing, pp. 3–21. DOI: `10.1007/978-3-319-72971-8_1`.

Publications: Distributed Scientific Workflows

◇ Tang, Meng, Guo, Luanzheng, Kougkas, Anthony, Sun, Xian-He, and **Tallent, Nathan R. May 2026**. "Characterization and Implications of Dataflow in HPC Workflows". In: *Proc. of the 40th IEEE Intl. Parallel and Distributed Processing Symp.* IEEE Computer Society.

◇ Rashid, Md Hasanur, **Tallent, Nathan R.**, Bao, Forrest Sheng, and Dai, Dong. **May 2026**. "CARAT: Client-Side Adaptive RPC and Cache Co-Tuning for Parallel File Systems". In: *Proc. of the 40th IEEE Intl. Parallel and Distributed Processing Symp.* IEEE Computer Society.

◇ Tang, Meng, Zhu, Zhaobin, Guo, Luanzheng, Bandy, James G., Carlson, Tim, Neuwirth, Sarah, Kougkas, Anthony, Sun, Xian-He, and **Tallent, Nathan R. Nov. 2025**. "Quantifying AWS S3 I/O Performance Boundaries Using the Roofline Model". In: *Proc. of the SC '25 Workshops of the Intl. Conf. for High Performance Computing, Networking, Storage and Analysis (10th Intl Parallel Data Systems Workshop).* New York, NY, USA: Association for Computing Machinery, pp. 1415–1423. DOI: 10.1145/3731599.3767513.

◇ Zhang, Boyuan, Fang, Bo, Ye, Fanjiang, Guo, Luanzheng, Song, Fengguang, **Tallent, Nathan R.**, and Tao, Dingwen. **June 2025**. "BMQSim: Overcoming Memory Constraints in Quantum Circuit Simulation with a High-Fidelity Compression Framework". In: *Proc. of the 39th ACM Intl. Conf. on Supercomputing.* **Best Paper Runner Up**. New York, NY, USA: Association for Computing Machinery, pp. 689–704. DOI: 10.1145/3721145.3725747.

◇ Firoz, Jesun, Lee, Hyungro, Guo, Luanzheng, Tang, Meng, **Tallent, Nathan R.**, and Peng, Zhen. **June 2025**. "FastFlow: Rapid Workflow Response by Prioritizing Critical Data Flows and their Interactions". In: *Proc. of the 37th Intl. Conf. on Scalable Scientific Data Management.* **Best Paper Nominee**. ACM, pp. 1–12. DOI: 10.1145/3733723.3733735.

◇ Lee, Hyungro, Firoz, Jesun, **Tallent, Nathan R.**, Guo, Luanzheng, and Halappanavar, Mahantesh. **June 2025**. "FlowForecaster: Automatically Inferring Detailed & Interpretable Workflow Scaling Models for Forecasts". In: *Proc. of the 39th IEEE Intl. Parallel and Distributed Processing Symp.* IEEE Computer Society, pp. 420–432. DOI: 10.1109/IPDPS64566.2025.00045.

◇ Newaz, Nahid, Ghosh, Sayan, **Tallent, Nathan R.**, and Qu, Guangzhi. **June 2025**. "Locality Aware Process Remapping for Distributed-Memory Graph Workloads". In: *Proc. of the 39th IEEE Intl. Parallel and Distributed Processing Symp.* IEEE Computer Society, pp. 447–459. DOI: 10.1109/IPDPS64566.2025.00047.

◇ Guo, Luanzheng, Tang, Meng, Lee, Hyungro, Firoz, Jesun, and **Tallent, Nathan R. Dec. 2024**. "Improving I/O-aware Workflow Scheduling via Data Flow Characterization and Trade-off Analysis". In: *Seventh IEEE Intl. Workshop on Benchmarking, Performance Tuning and Optimization for Big Data Applications (Proc. of the IEEE Intl. Conf. on Big Data).* IEEE Computer Society. DOI: 10.1109/BigData62323.2024.10825855.

◇ Egersdoerfer, Chris, Rashid, Md. Hasanur, Dai, Dong, Fang, Bo, and **Tallent, Nathan R. Nov. 2024**. "Understanding and Predicting Cross-Application I/O Interference in HPC Storage Systems". In: *Proc. of the Workshops of the Intl. Conf. for High Performance Computing, Networking, Storage and Analysis (9th Intl. Parallel Data Systems Workshop).* DOI: 10.1109/SCW63240.2024.00174.

◇ Tang, Meng, Cernuda, Jaime, Ye, Jie, Guo, Luanzheng, **Tallent, Nathan R.**, Kougkas, Anthony, and Sun, Xian-He. **Sept. 2024**. "DaYu: Optimizing Distributed Scientific Workflows by Decoding Dataflow Semantics and Dynamics". In: *Proc. of the 2024 IEEE Conf. on Cluster Computing.* IEEE, pp. 357–369. DOI: 10.1109/CLUSTER59578.2024.00038.

◇ Lee, Hyungro, Guo, Luanzheng, Tang, Meng, Firoz, Jesun, **Tallent, Nathan**, Kougkas, Anthony, and Sun, Xian-He. **Nov. 2023**. "Data Flow Lifecycles for Optimizing Workflow Coordination". In: *Proc. of the Intl. Conf. for High Performance Computing, Networking, Storage and Analysis (SuperComputing).* SC '23. New York, NY, USA: Association for Computing Machinery. DOI: 10.1145/3581784.3607104.

◇ Acer, Seher, **Tallent, Nathan R.** et al. **Sept. 2021**. "EXAGRAPH: Graph and Combinatorial Methods for Enabling Exascale Applications". In: *International Journal of High Performance Computing Applications*, p. 10943420211029299. DOI: 10.1177/10943420211029299.

◇ Bel, Oceane, Mukhopadhyay, Sinjoni, **Tallent, Nathan R.**, Nawab, Faisal, and Long, Darrell. **Dec. 2021**. "Win-

nowML: Stable feature selection for maximizing prediction accuracy of time-based system modeling". In: *Proc. of the 2021 IEEE Intl. Conf. on Big Data (Fifth IEEE Intl. Workshop on Benchmarking, Performance Tuning and Optimization for Big Data Applications)*, pp. 3031–3041. DOI: `10.1109/BigData52589.2021.9671602`.

◇ Bel, Oceane, Pata, Joosep, Vlimant, Jean-Roch, **Tallent, Nathan**, Balcas, Justas, and Spiropulu, Maria. **May 2021**. "Diolkos: Improving ethernet throughput through dynamic port selection". In: *18th ACM International Conference on Computing Frontiers.* New York, NY, USA: ACM. DOI: `10.1145/3457388.3458659`.

◇ Friese, Ryan D., Mutlu, Burcu O., **Tallent, Nathan R.**, Suetterlein, Joshua, and Strube, Jan. **Dec. 2020**. "Effectively Using Remote I/O For Work Composition in Distributed Workflows". In: *Proc. of the 2020 IEEE Intl. Conf. on Big Data.* IEEE Computer Society, pp. 426–433. DOI: `10.1109/BigData50022.2020.9378352`.

◇ Bel, Oceane, Chang, Kenneth, **Tallent, Nathan R.**, Duellmann, Dirk, Miller, Ethan L., Nawab, Faisal, and Long, Darrell D. E. **Oct. 2020**. "Geomancy: Automated Performance Enhancement through Data Layout Optimization". In: *36th Intl. Conf. on Massive Storage Systems and Technology.* DOI: `https://storageconference.us/2020/Papers/10.Geomancy.pdf`.

◇ Suetterlein, Joshua, Friese, Ryan D., **Tallent, Nathan R.**, and Schram, Malachi. **Dec. 2019**. "TAZeR: Hiding the Cost of Remote I/O in Distributed Scientific Workflows". In: *Proc. of the 2019 IEEE Intl. Conf. on Big Data.* IEEE Computer Society, pp. 383–394. DOI: `10.1109/BigData47090.2019.9006418`.

◇ Schram, Malachi, **Tallent, Nathan**, Friese, Ryan, and Singh, Alok. **Sept. 2019**. "Application of Deep Learning on Integrating Prediction, Provenance, and Optimization". In: *EPJ Web Conf.* Ed. by Peter Hristov, Latchezar Betev, and Maarten Litmaath. Vol. 214. DOI: `10.1051/epjconf/201921406007`.

◇ Bhuiyan, Tanveer Hossain, Halappanavar, Mahantesh, Friese, Ryan D., Medal, Hugh, de la Torre, Luis, Sathanur, Arun, and **Tallent, Nathan R. 2019e**. "Stochastic Programming Approach for Resource Selection Under Demand Uncertainty". In: *Job Scheduling Strategies for Parallel Processing.* Ed. by Dalibor Klusáček, Walfredo Cirne, and Narayan Desai. Cham: Springer International Publishing, pp. 107–126. DOI: `10.1007/978-3-030-10632-4_6`.

◇ Singh, Alok, Altintas, Ilkay, Schram, Malachi, and **Tallent, Nathan**. **Dec. 2018**. "Deep Learning for Enhancing Fault Tolerant Capabilities of Scientific Workflows". In: *Second IEEE Intl. Workshop on Benchmarking, Performance Tuning and Optimization for Big Data Applications (Proc. of the IEEE Intl. Conf. on Big Data)*, pp. 3905–3914. DOI: `10.1109/BigData.2018.8622509`.

◇ Friese, Ryan D., **Tallent, Nathan R.**, Schram, Malachi, Halappanavar, Mahantesh, and Barker, Kevin J. **Sept. 2018**. "Optimizing Distributed Data-Intensive Workflows". In: *Proc. of the 2018 IEEE Conf. on Cluster Computing.* IEEE, pp. 279–289. DOI: `10.1109/CLUSTER.2018.00045`.

◇ Schram, Malachi, Bansal, Vikas, Friese, Ryan D., **Tallent, Nathan R.**, Yin, Jian, Barker, Kevin J., Stephan, Eric, Halappanavar, Mahantesh, and Kerbyson, Darren J. **Nov. 2017**. "Integrating Prediction, Provenance, and Optimization into High Energy Workflows". In: *J. Phys. Conf. Ser.* 898.6, p. 062052.

◇ Halappanavar, Mahantesh, Schram, Malachi, de La Torre, Luis, Barker, Kevin, **Tallent, Nathan R.**, and Kerbyson, Darren. **Nov. 2015**. "Towards Efficient Scheduling of Data Intensive High Energy Physics Workflows". In: *WORKS '15: Workshop on Workflows in Support of Large-Scale Science, held in conjunction with SuperComputing 15.* DOI: `10.1145/2822332.2822335`.

Publications: Hardware/Software Co-design

◇ Hou, Shiyue, **Tallent, Nathan R.**, Wang, Li, and Mi, Ningfang. **Oct. 2024**. "Performance Analysis of Data Processing in Distributed File Systems with Near Data Processing". In: *11th Intl. Symp. on Networks, Computers and Communications.* IEEE. DOI: `10.1109/ISNCC62547.2024.10758994`.

◇ Suriyakumar, Yasodha, **Tallent, Nathan R.**, Marquez, Andrés, and Karavanic, Karen. **Sept. 2024**. "MemFriend: Understanding Memory Performance with Spatial-Temporal Affinity". In: *Proc. of the International Symposium on Memory Systems (MemSys 2024).* New York, NY, USA: ACM. DOI: `10.1145/3695794.3695820`.

◇ Newaz, Nahid, Ghosh, Sayan, **Tallent, Nathan R.**, Suetterlein, Joshua, Mollah, Atiqul, and Ming, Hua. **May 2024**. "Graph Analytics on Jellyfish Topology". In: *Proc. of the 38th IEEE Intl. Parallel and Distributed Processing Symp.* DOI: `10.1109/IPDPS57955.2024.00079`.

◇ Kilic, Ozgur O., **Tallent, Nathan R.**, Suriyakumar, Yasodhadevi, Xie, Chenhao, Marquez, Andrés, and Eranian, Stephane. **Sept. 2022**. "MemGaze: Rapid and Effective Load-Level Memory and Data Analysis". In: *Proc. of the 2022 IEEE Conf. on Cluster Computing*. IEEE. DOI: `10.1109/CLUSTER51413.2022.00058`.

◇ Ghosh, Sayan, **Tallent, Nathan R.**, Minutoli, Marco, Halappanavar, Mahantesh, Peri, Ramesh, and Kalyanaraman, Ananth. **Nov. 2021**. "Single-node Partitioned-Memory for Huge Graph Analytics: Cost and Performance Tradeoffs". In: *Proc. of the Intl. Conf. for High Performance Computing, Networking, Storage and Analysis (SuperComputing)*. New York, NY, USA: ACM, pp. 1–14. DOI: `10.1145/3458817.3476156`.

◇ Kilic, Ozgur O., **Tallent, Nathan R.**, and Friese, Ryan D. **Oct. 2020**. "Rapid Memory Footprint Access Diagnostics". In: *Proc. of the 2020 IEEE Intl. Symp. on Performance Analysis of Systems and Software*. IEEE Computer Society, pp. 273–284. DOI: `10.1109/ISPASS48437.2020.00047`.

◇ Kilic, Ozgur O., **Tallent, Nathan R.**, and Friese, Ryan D. **Sept. 2019**. "Rapidly Measuring Loop Footprints". In: *Proc. of IEEE Intl. Conf. on Cluster Computing (Workshop on Monitoring and Analysis for High Performance Computing Systems Plus Applications)*. IEEE Computer Society, pp. 1–9. DOI: `10.1109/CLUSTER.2019.8891025`.

Publications: Performance Analysis and Modeling

◇ Naraparaju, Ramasoumya, Zhao, Tianyu, Hu, Yanting, Zhao, Dongfang, Guo, Luanzheng, and **Tallent, Nathan R. Nov. 2024**. "Shifting Between Compute and Memory Bounds: A Compression-Enabled Roofline Model". In: *Proc. of the Workshops of the Intl. Conf. for High Performance Computing, Networking, Storage and Analysis (10th Intl. Workshop on Data Analysis and Reduction for Big Scientific Data)*. ACM. DOI: `10.1109/SCW63240.2024.00047`.

◇ Suetterlein, Joshua, Young, Stephen J., Firoz, Jesun, Manzano, Joseph, Friese, Ryan, **Tallent, Nathan R.**, Barker, Kevin, and Stavenger, Timothy. **Sept. 2024**. "HPC Network Simulation Tuning via Automatic Extraction of Hardware Parameters". In: *Proc. of the 2024 IEEE High Performance Extreme Computing Conference*, pp. 1–10. DOI: `10.1109/HPEC62836.2024.10938439`.

◇ Sathanur, Arun, **Tallent, Nathan R.**, Konsor, Patrick, Koyanagi, Ken, McLaughlin, Ryan, Olivas, Joseph, and Chynoweth, Michael. **May 2022**. "QuaL^{2}M: Learning Quantitative Performance of Latency-Sensitive Code". In: *Proc. of the 2022 IEEE Intl. Parallel and Distributed Processing Symp. Workshops (17th Intl. Workshop on Automatic Performance Tuning)*. IEEE, pp. 913–923. DOI: `10.1109/IPDPSW55747.2022.00149`.

◇ Ghosh, Sayan, **Tallent, Nathan R.**, and Halappanavar, Mahantesh. **Aug. 2021**. "Characterizing Performance of Graph Neighborhood Communication Patterns". In: *IEEE Transactions on Parallel and Distributed Systems*. DOI: `10.1109/TPDS.2021.3101425`.

◇ Barik, Reet, Minutoli, Marco, Halappanavar, Mahantesh, **Tallent, Nathan R.**, and Kalyanaraman, Ananth. **Oct. 2020**. "Vertex Reordering for Real-world Graphs and Applications: An Empirical Evaluation". In: *Proc. of the 2020 IEEE Intl. Symp. on Workload Characterization*. DOI: `10.1109/IISWC50251.2020.00031`.

◇ Li, Ang, Song, S., Chen, J., Li, J., Liu, X., **Tallent, Nathan**, and Barker, Kevin J. **Jan. 2020**. "Evaluating Modern GPU Interconnect: PCIe, NVLink, NV-SLI, NVSwitch and GPUDirect". In: *IEEE Transactions on Parallel and Distributed Systems* 31.1, pp. 94–110. DOI: `10.1109/TPDS.2019.2928289`.

◇ Li, Ang, Song, Shuaiwen Leon, Liu, Xu, **Tallent, Nathan**, and Barker, Kevin. **Sept. 2018**. "Tartan: Evaluating Modern GPU Interconnect via a Multi-GPU Benchmark Suite". In: *Proc. of the 2018 IEEE Intl. Symp. on Workload Characterization*. **Best Paper Finalist**, pp. 191–202. DOI: `10.1109/IISWC.2018.8573483`.

◇ Gawande, Nitin A., Daily, Jeff A., Siegel, Charles, **Tallent, Nathan R.**, and Vishnu, Abhinav. **May 2018**. "Scaling Deep Learning Workloads: NVIDIA DGX-1/Pascal and Intel Knights Landing". In: *Future Generation Computer Systems*. DOI: `https://doi.org/10.1016/j.future.2018.04.073`.

◇ **Tallent, Nathan R.**, Kerbyson, Darren J., and Hoisie, Adolfy. **Nov. 2017**. "Representative Paths Analysis". In: *Proc. of the Intl. Conf. for High Performance Computing, Networking, Storage and Analysis (SuperComputing)*. New York, NY, USA: ACM, 34:1–34:12. DOI: `10.1145/3126908.3126962`.

◇ **Tallent, Nathan R.**, Gawande, Nitin A., Siegel, Charles, Vishnu, Abhinav, and Hoisie, Adolfy. **Dec. 2017**. "Evaluating On-Node GPU Interconnects for Deep Learning Workloads". In: *High Performance Computing Systems. Performance Modeling, Benchmarking, and Simulation*. Ed. by Stephen Jarvis, Steven Wright, and Simon

Hammond. Springer International Publishing, pp. 3–21. DOI: `10.1007/978-3-319-72971-8_1`.

◇ Friese, Ryan D., **Tallent, Nathan R.**, Vishnu, Abhinav, Kerbyson, Darren J., and Hoisie, Adolfy. **May 2017**. "Generating Performance Models for Irregular Applications". In: *Proc. of the 31st IEEE Intl. Parallel and Distributed Processing Symp.* Los Alamitos, CA, USA: IEEE Computer Society, pp. 317–326. DOI: `10.1109/IPDPS.2017.61`.

◇ Vishnu, Abhinav, van Dam, Hubertus, **Tallent, Nathan R.**, Kerbyson, Darren J., and Hoisie, Adolfy. **May 2016**. "Fault Modeling of Extreme Scale Applications Using Machine Learning". In: *Proc. of the 30th IEEE Intl. Parallel and Distributed Processing Symp.* Los Alamitos, CA, USA: IEEE Computer Society, pp. 222–231. DOI: `10.1109/IPDPS.2016.111`.

◇ **Tallent, Nathan R.**, Barker, Kevin J., Chavarría-Miranda, Daniel, Tumeo, Antonino, Halappanavar, Mahantesh, Márquez, Andrés, Kerbyson, Darren J., and Hoisie, Adolfy. **Aug. 2016**. "Modeling the Impact of Silicon Photonics on Graph Analytics". In: *Proc. of the 11th IEEE Intl. Conf. on Networking, Architecture, and Storage.* IEEE Computer Society, pp. 1–11. DOI: `10.1109/NAS.2016.7549410`.

◇ Venkatesh, Akshay, Vishnu, Abhinav, Hamidouche, Khaled, **Tallent, Nathan**, Panda, Dhabaleswar (DK), Kerbyson, Darren, and Hoisie, Adolfy. **Nov. 2015**. "A Case for Application-Oblivious Energy-Efficient MPI Runtime". In: *Proc. of the Intl. Conf. for High Performance Computing, Networking, Storage and Analysis (SuperComputing).* SC '15. **Best Student Paper Nominee**. New York, NY, USA: ACM, 29:1–29:12. DOI: `10.1145/2807591.2807658`.

◇ Gawande, Nitin A., Manzano, Joseph B., Tumeo, Antonino, **Tallent, Nathan R.**, Kerbyson, Darren J., and Hoisie, Adolfy. **July 2015**. "Power and performance trade-offs for Space Time Adaptive Processing". In: *ASAP '15: Proc. of the 26th IEEE Intl. Conf. on Application-specific Systems, Architectures and Processors.* IEEE, pp. 41–48. DOI: `10.1109/ASAP.2015.7245703`.

◇ **Tallent, Nathan R.**, Vishnu, Abhinav, Dam, Huub Van, Daily, Jeff, Kerbyson, Darren, and Hoisie, Adolfy. **2015f**. "Diagnosing the Causes and Severity of One-Sided Message Contention". In: *Proc. of the 20th ACM SIGPLAN Symp. on Principles and Practice of Parallel Programming.* New York, NY, USA: ACM. DOI: `10.1145/2688500.2688516`.

◇ **Tallent, Nathan R.** and Hoisie, Adolfy. **2014g**. "Palm: Easing the Burden of Analytical Performance Modeling". In: *Proc. of the 28th ACM Intl. Conf. on Supercomputing.* New York, NY, USA: ACM, pp. 221–230. DOI: `10.1145/2597652.2597683`.

◇ Liu, Xu, Mellor-Crummey, John, and **Tallent, Nathan R. 2012a**. "Analyzing Application Performance Bottlenecks on Intel's SCC". in: *Proc. of the TACC-Intel Highly Parallel Computing Symp.*

◇ **Tallent, Nathan R.** and Mellor-Crummey, John. **2012c**. "Using Sampling to Understand Parallel Program Performance". In: *Tools for High Performance Computing 2011.* Ed. by Holger Brunst, Matthias S. Müller, Wolfgang E. Nagel, and Michael M. Resch. Springer, pp. 13–25. DOI: `http://dx.doi.org/10.1007/978-3-642-31476-6_2`.

◇ **Tallent, Nathan R.** and Kerbyson, Darren. **2012b**. "Data-centric Performance Analysis of PGAS Applications". In: *WHIST 2012: Proc. of the 2nd Intl. Workshop on High-performance Infrastructure for Scalable Tools, held with the 26th Intl. Conf. on Supercomputing.*

◇ **Tallent, Nathan R.**, Mellor-Crummey, John M., Franco, Michael, Landrum, Reed, and Adhianto, Laksono. **2011d**. "Scalable fine-grained call path tracing". In: *Proc. of the 25th Intl. Conf. on Supercomputing.* New York, NY, USA: ACM, pp. 63–74. DOI: `10.1145/1995896.1995908`.

◇ **Tallent, Nathan R.**, Adhianto, Laksono, and Mellor-Crummey, John M. **2010f**. "Scalable Identification of Load Imbalance in Parallel Executions Using Call Path Profiles". In: *Proc. of the 2010 ACM/IEEE Intl. Conf. for High Performance Computing, Networking, Storage and Analysis (SuperComputing).* Washington, DC, USA: IEEE Computer Society, pp. 1–11. DOI: `http://dx.doi.org/10.1109/SC.2010.47`.

◇ Adhianto, Laksono, Mellor-Crummey, John, and **Tallent, Nathan R. 2010d**. "Effectively Presenting Call Path Profiles of Application Performance". In: *PSTI 2010: Proc. of the 2010 Workshop on Parallel Software Tools and Tool Infrastructures, held with the 2010 Intl. Conf. on Parallel Processing.* Los Alamitos, CA, USA: IEEE Computer Society, pp. 179–188. DOI: `http://doi.ieeecomputersociety.org/10.1109/ICPPW.2010.35`.

◇ Adhianto, Laksono, Banerjee, Sinchan, Fagan, Mike, Krentel, Mark, Marin, Gabriel, Mellor-Crummey, John, and

Tallent, Nathan R. 2010c. "HPCToolkit: Tools for performance analysis of optimized parallel programs". In: *Concurrency and Computation: Practice and Experience* 22.6, pp. 685–701. DOI: http://dx.doi.org/10.1002/cpe.1553.

◇ **Tallent, Nathan R.**, Mellor-Crummey, John M., and Porterfield, Allan. **2010g**. "Analyzing Lock Contention in Multithreaded Applications". In: *Proc. of the 15th ACM SIGPLAN Symp. on Principles and Practice of Parallel Programming*. Bangalore, India: ACM, pp. 269–280. DOI: http://doi.acm.org/10.1145/1693453.1693489.

◇ **Tallent, Nathan R.** and Mellor-Crummey, John M. **2009f**. "Identifying Performance Bottlenecks in Work-Stealing Computations". In: *Computer* 42.12, pp. 44–50. DOI: http://doi.ieeecomputersociety.org/10.1109/MC.2009.396.

◇ **Tallent, Nathan R.**, Mellor-Crummey, John M., Adhianto, Laksono, Fagan, Michael W., and Krentel, Mark. **2009g**. "Diagnosing Performance Bottlenecks in Emerging Petascale Applications". In: *Proc. of the 2009 ACM/IEEE Intl. Conf. for High Performance Computing, Networking, Storage and Analysis (SuperComputing)*. Portland, Oregon: ACM, pp. 1–11. DOI: http://doi.acm.org/10.1145/1654059.1654111.

◇ **Tallent, Nathan R.**, Mellor-Crummey, John, and Fagan, Michael W. **2009e**. "Binary Analysis for Measurement and Attribution of Program Performance". In: *Proc. of the 2009 ACM SIGPLAN Conf. on Programming Language Design and Implementation*. **Distinguished Paper**. Dublin, Ireland: ACM, pp. 441–452. DOI: http://doi.acm.org/10.1145/1542476.1542526.

◇ Fowler, Robert, Adhianto, Laksono, de Supinski, Bronis, Fagan, Michael, Gamblin, Todd, Krentel, Mark, Mellor-Crummey, John, Schulz, Martin, and **Tallent, Nathan**. **2009c**. "Frontiers of Performance Analysis on Leadership-Class Systems". In: *Journal of Physics: Conference Series* 180, p. 012041. DOI: 10.1088/1742–6596/180/1/012041.

◇ **Tallent, Nathan R.** and Mellor-Crummey, John. **2009d**. "Effective Performance Measurement and Analysis of Multithreaded Applications". In: *Proc. of the 14th ACM SIGPLAN Symp. on Principles and Practice of Parallel Programming*. **Best Paper**. Raleigh, NC, USA: ACM, pp. 229–240. DOI: http://doi.acm.org/10.1145/1504176.1504210.

◇ **Tallent, Nathan**, Mellor-Crummey, John, Adhianto, Laksono, Fagan, Mike, and Krentel, Mark. **2008d**. "HPC-Toolkit: Performance Tools for Scientific Computing". In: *Journal of Physics: Conference Series* 125, 012088 (5pp).

◇ Adhianto, L., Fagan, M., Krentel, M., Marin, G., Mellor-Crummey, J., and **Tallent, N. R. Nov. 2008**. "HPCToolkit: Performance Measurement and Analysis for Supercomputers with Node-level Parallelism". In: *Proc. of the Workshop on Node Level Parallelism for Large Scale Supercomputers, held with Supercomputing 2008*.

◇ Mellor-Crummey, John and **Tallent, Nathan R. Feb. 2008**. "A Methodology for Accurate, Effective and Scalable Performance Analysis of Application Programs". In: *Proc. of the Workshop on Tools, Infrastructures and Methodologies for the Evaluation of Research Systems, held with the 2008 IEEE Intl. Symp. on Performance Analysis of Systems and Software*, pp. 4–11.

◇ Froyd, Nathan, **Tallent, Nathan**, Mellor-Crummey, John, and Fowler, Robert. **2006**. "Call path profiling for unmodified, optimized binaries". In: *GCC Summit '06: Proc. of the GCC Developers' Summit*. Ottawa, Ontario, pp. 21–36.

◇ Mellor-Crummey, John, Fowler, Robert, Marin, Gabriel, and **Tallent, Nathan**. **2002**. "HPCView: A Tool for Top-down Analysis of Node Performance". In: *The Journal of Supercomputing* 23.1, pp. 81–104. DOI: http://dx.doi.org/10.1023/A:1015789220266.

Publications: Workload Characterization and Compilers

◇ **Tallent, Nathan R.**, Manzano, Joseph B., Gawande, Nitin A., Kang, Seunghwa, Kerbyson, Darren J., Hoisie, Adolfy, and Cross, Joseph K. **May 2016**. "Algorithm and Architecture Independent Benchmarking with SEAK". in: *Proc. of the 30th IEEE Intl. Parallel and Distributed Processing Symp.* Los Alamitos, CA, USA: IEEE Computer Society, pp. 63–72. DOI: 10.1109/IPDPS.2016.25.

◇ Barker, Kevin, **Tallent, Nathan R.** et al. **Dec. 2013**. *PERFECT (Power Efficiency Revolution For Embedded*

Computing Technologies) Benchmark Suite Manual. Pacific Northwest National Laboratory and Georgia Tech Research Institute.

◇ Utke, Jean, Naumann, Uwe, Fagan, Mike, **Tallent, Nathan**, Strout, Michelle, Heimbach, Patrick, Hill, Chris, and Wunsch, Carl. **2008e**. "OpenAD/F: A Modular Open-Source Tool for Automatic Differentiation of Fortran Codes". In: *ACM Trans. Math. Softw.* 34.4, pp. 1–36. DOI: `10.1145/1377596.1377598`.

Publications (other)

◇ **Tallent, Nathan** et al. **Oct. 2024**. *Final Report for CHESS: Cloud, High-Performance Computing, and Edge for Science and Security.* Tech. rep. PNNL-36859. Pacific Northwest National Laboratory. DOI: `10.48550/arXiv.2410.16093`.

◇ Ferreira da Silva, Rafael, **Tallent, Nathan** et al. **Oct. 2024**. *Workflows Community Summit 2024: Future Trends and Challenges in Scientific Workflows.* DOI: `10.5281/zenodo.13844759`.

◇ **Tallent, Nathan R.**, Hoisie, Adolfy, and Plata, Charity. **May 2014**. *Palm: Making Application Modeling Easier.* PNNL Computational Sciences and Mathematics Division Research Highlights. `http://www.pnnl.gov/science/highlights/highlight.asp?id=2652`.

◇ Barker, Kevin, **Tallent, Nathan** et al. **2014f**. "Assessing the Impact of Future Embedded Technologies: The TAV Approach in PERFECT". in: *Proc. of the 38th Annual GOMACTech Conference.*

◇ Hoisie, Adolfy, **Tallent, Nathan** et al. **Dec. 2013**. "Tackling the Power and Energy Wall for Future HPC Systems". In: *HPCwire.*

◇ Mellor-Crummey, John, **Tallent, Nathan R.**, Fagan, Mike, and Odegard, Jan. **May 2007**. "Application Performance Profiling on the Cray XD1 Using HPCToolkit". In: *Proc. of the Cray User's Group.* Seattle, WA.

◇ Fagan, Mike and **Tallent, Nathan R. 2003c**. *Design and Implementation of whirl2xaif and xaif2whirl.* Tech. rep. TR03-16. Houston, TX: Rice University.

◇ Fagan, Mike and **Tallent, Nathan R. 2003d**. *Porting Open64 to the Cygwin Enviroment.* Tech. rep. TR03-15. Houston, TX: Rice University.

Talks

◇ **Tallent, Nathan R. Oct. 2022**. "Keynote: Towards Orchestrating Distributed & Data-Intensive Workflows". Second Workshop on Reproducible Workflows, Data, and Security, in conjuction with 2022 IEEE 18th International Conference on e-Science.

◇ **Tallent, Nathan R. Sept. 2022**. "Invited Talk: Orchestration for Distributed and Data-Intensive Workflows". 2022 DOE Computer Graphics Forum (CGF).

◇ **Tallent, Nathan R.**, Friese, Ryan D., Suetterlein, Joshua, and Strube, Jan. **Aug. 2020**. *Performance Portability of Remote I/O in Distributed Workflows.* 2020 Performance, Portability, and Productivity in HPC Forum.

◇ **Tallent, Nathan R. Aug. 2019**. *Predicting and Improving I/O Throughput Using Reinforcement Learning.* Workshop on Modeling and Simulation of Systems and Applications.

◇ **Tallent, Nathan R. Aug. 2018**. *Increasing Performance by Forecasting Job Failures in Distributed Workflows.* Workshop on Modeling and Simulation of Systems and Applications.

◇ **Tallent, Nathan R. July 2018**. *Optimizing Distributed Data-Intensive Workflows.* Mini-Symposium on Data over Distance: Convergence of Networking, Storage, Transport, and Software Frameworks.

◇ **Tallent, Nathan R. 2018g**. "Mis-predicting Performance". In: *Performance Portability in Extreme Scale Computing (Dagstuhl Seminar 17431).* Ed. by Anshu Dubey, Paul H. J. Kelly, Bernd Mohr, and Jeffrey S. Vetter. Vol. 7. 10. Dagstuhl, Germany: Schloss Dagstuhl–Leibniz-Zentrum fuer Informatik, pp. 84–110. DOI: `10.4230/DagRep.7.10.84`.

◇ **Tallent, Nathan R. Sept. 2016**. *Using Predictive Modeling to Evaluate Analytics Workloads.* Scalable Approaches to High Performance and High Productivity Computing.

◇ **Tallent, Nathan R. Oct. 2015**. *Understanding Irregular Application Performance with Analytical Models.* William

and Mary Computer Science Seminar.

◇ **Tallent, Nathan R. July 2015**. *Palm: Easing the Burden of Analytical Performance Modeling.* Workshop on Performance Modeling: Methods & Applications, held with 2015 Intl. Supercomputing Conf.

◇ **Tallent, Nathan**. **Sept. 2014**. *Towards Analytical Modeling of Application Irregularity.* 2014 Scalable Approaches to High Performance and High Productivity Computing.

◇ **Tallent, Nathan**. **Aug. 2014**. *Palm: Easing the Burden of Analytical Performance Modeling.* 2014 Petascale Tools Workshop.

◇ **Tallent, Nathan**. **Feb. 2014**. "Effectively Presenting Application Performance Using Simple Techniques". In: *Proc. of the 2014 SIAM Conf. on Parallel Processing for Scientific Computing.* Minisymposium Contributor Talk.

◇ **Tallent, Nathan**. **Sept. 2011**. *Using Sampling to Understand Parallel Program Performance.* 5th Parallel Tools Workshop.

◇ Mellor-Crummey, John, **Tallent, Nathan**, and Liu, Xu. **Aug. 2011**. *HPCToolkit: New Capabilities, Ongoing Work, and Challenges Ahead.* 2011 Workshop on Performance Tools for Extreme Scale Computing (Center for Scalable Application Development Software).

◇ **Tallent, Nathan R. Nov. 2010**. *Performance Analysis for Parallel Programs: From Multicore to Petascale.* Supercomputing 2010 George Michael HPC Fellow Presentation.

◇ **Tallent, Nathan**. **Aug. 2010**. *Scalable Identification of Load Imbalance in Parallel Executions Using Call Path Profiles.* 2010 Workshop on Performance Tools for Petascale Computing (Center for Scalable Application Development Software).

◇ **Tallent, Nathan R. 2010e**. "Identifying Scalability Bottlenecks In Large-scale Parallel Programs Using HPC-Toolkit". In: *Program Development for Extreme-Scale Computing.* Ed. by Jesus Labarta, Barton P. Miller, Bernd Mohr, and Martin Schulz. Dagstuhl Seminar Proceedings 10181. Dagstuhl, Germany: Schloss Dagstuhl - Leibniz-Zentrum fuer Informatik, Germany.

◇ **Tallent, Nathan R. Nov. 2009**. *Performance Analysis of Parallel Programs: From Multicore to Petascale.* Supercomputing 2009 Doctoral Research Showcase.

◇ **Tallent, Nathan R. July 2009**. *Performance Measurement and Analysis of Multithreaded Programs.* 2009 Workshop on Performance Tools for Petascale Computing (Center for Scalable Application Development Software).

◇ **Tallent, Nathan R. July 2007**. *HPCToolkit: A Performance Analysis Toolkit.* 2007 Workshop on Performance Tools for Petascale Computing (Center for Scalable Application Development Software).

◇ Mellor-Crummey, John, Fowler, Robert, and **Tallent, Nathan R. Nov. 2004**. *Practical Application Performance Analysis on Linux Systems.* Supercomputing 2004 Tutorial.

◇ **Tallent, Nathan R. Aug. 2003**. *HPCToolkit: Top-down analysis of node performance.* 2003 MCS Divisional Seminars and Colloquia, Argonne National Laboratory.

Posters

◇ Zhang, Boyuan, **Tallent, Nathan R.** et al. **Mar. 2025**. "ViSemZ: High-performance Visual Semantics Compression for AI-Driven Science". In: *ACM SIGPLAN Symp. on Principles and Practice of Parallel Programming.* DOI: 3710848.3710851.

◇ Ashraf, Rizwan, Guo, Luanzheng, and **Tallent, Nathan R. Dec. 2024**. "Identifying Outliers in AI-based Image Compression". In: *Proc. of the IEEE Intl. Conf. on Big Data.* IEEE Computer Society.

◇ Hoang, Alvin, Chen, Brian, Guo, Luanzheng, Ashraf, Rizwan, and **Tallent, Nathan R. Nov. 2024**. "Profiling and Bottleneck Identification for Large Language Model Optimizations". In: *Proc. of the 2024 ACM/IEEE Intl. Conf. for High Performance Computing, Networking, Storage and Analysis (SuperComputing), Poster Session.* ACM.

◇ Chen, Brian, Hoang, Alvin, Guo, Luanzheng, Ashraf, Rizwan, She, Buxin, and **Tallent, Nathan R. Nov. 2024**. "Empowering Scientific Datasets with Large Language Models". In: *Proc. of the 2024 ACM/IEEE Intl. Conf. for High Performance Computing, Networking, Storage and Analysis (SuperComputing), Poster Session.* ACM.

⬦ Tang, Meng, **Tallent, Nathan R.**, Kougkas, Anthony, and Sun, Xian-He. **Nov. 2023**. "Optimizing Workflow Performance by Elucidating Semantic Data Flow". In.

⬦ Newaz, Nahid, **Tallent, Nathan R.**, Suetterlein, Joshua, and Ghosh, Sayan. **Nov. 2023**. "Simulating Application Agnostic Process Assignment for Graph Workloads on Dragonfly and Fat Tree topologies". In.

⬦ Koutsoheras, Nikos, Ghosh, Sayan, Suetterlein, Joshua, and **Tallent, Nathan R. Nov. 2023**. "The impact of process topology on RMA programming models: A study on NERSC Perlmutter". In.

⬦ Bel, Oceane, Chang, Kenneth, **Tallent, Nathan R.**, Duellmann, Dirk, Miller, Ethan L., Nawab, Faisal, and Long, Darrell D. E. **Apr. 2020**. "Geomancy: Automated Performance Enhancement through Data Layout Optimization". In: *Proc. of the 2020 IEEE Intl. Symp. on Performance Analysis of Systems and Software*. IEEE Computer Society, pp. 119–120. DOI: 10.1109/ISPASS48437.2020.00025.

⬦ **Tallent, N. R.**, Barker, K. J., Gioiosa, R., Marquez, A., Kestor, G., Song, L., Tumeo, A., Kerbyson, D. J., and Hoisie, A. **Aug. 2016**. "Assessing Advanced Technology in CENATE". in: *Proc. of the 11th IEEE Intl. Conf. on Networking, Architecture, and Storage*. IEEE Computer Society, pp. 1–2. DOI: 10.1109/NAS.2016.7549392.

⬦ **Tallent, Nathan R.**, Vishnu, Abhinav, Dam, Huub Van, Daily, Jeff, Kerbyson, Darren, and Hoisie, Adolfy. **2014h**. "Diagnosing Network Bottlenecks: One-sided Message Contention". In: *Proc. of the 2014 ACM/IEEE Intl. Conf. for High Performance Computing, Networking, Storage and Analysis (SuperComputing), Poster Session*. **Best Poster Nomination**.

⬦ Barker, Kevin J., **Tallent, Nathan R.** et al. **June 2014**. *Assessing the Impact of Future Embedded Technologies within the DARPA PERFECT Program*. DAC Workshop on Suite of Embedded Applications and Kernels.

⬦ **Tallent, Nathan**, Mellor-Crummey, John, and Bernat, Andrew. **2011c**. *Performance Tools for Scalable Parallel Systems*. SciDAC Conference.

⬦ Adhianto, L., Banerjee, S., Fagan, M., Krentel, M., Marin, G., Mellor-Crummey, J., and **Tallent, N. R. 2008c**. "HPCToolkit: Performance tools for Scientific Computing". In: *Proc. of the 2008 ACM/IEEE Intl. Conf. for High Performance Computing, Networking, Storage and Analysis (SuperComputing)*. Austin, Texas: ACM.

⬦ Fagan, Mike and **Tallent, Nathan R. July 2004**. *OpenADFortTk: OpenAD's Fortran Front End*. AD2004: The 4th Intl. Conf. on Automatic Differentiation.

⬦ Froyd, Nathan, Mellor-Crummey, John, and **Tallent, Nathan R. Oct. 2003**. *A Sample-Driven Call Stack Profiler*. 4th Symp. of the Los Alamos Computer Science Institute (LACSI 2003).

Mentoring, Advising

⬦ Mentoring for more than 30 Post Doctoral Researchers and Interns

⬦ Ph.D. Committee, Hasanur Rashid, University of Delaware

⬦ Ph.D. Committee, Yasodha Suriyakumar, Portland State University

⬦ Ph.D. Committee, Oceane Bel, University of California, Santa Cruz