

**Tyler Andrew Simon**  
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## EDUCATION

**University of Maryland Baltimore County (UMBC)** Baltimore, MD  
Ph.D. Computer Science Dec. 2013  
Thesis:  
*Multi-objective Task Scheduling for Scalable High Performance Computing*

**University of Mississippi (Ole Miss)** Oxford, MS  
M.S. Computer Science May 2005  
B.A. Computer Science and Philosophy Dec. 2002  
Minor: Mathematics

## PROFESSIONAL EXPERIENCE

*Technical Director, HPC Application Development and Optimization* Mar. 2018 - Present  
*Senior Researcher, Advanced Computing Systems* Sep. 2014 - Mar. 2018  
U.S. Department of Defense

*Adjunct Faculty* Feb. 2011 - Present  
The University of Maryland, Baltimore County Baltimore, MD  
Department of Computer Science and Electrical Engineering  
Teaching:

- CMSC 483/681: Parallel and Distributed Processing (Spring '14,'15,'16,'17,'18)
- CMSC 455/655: Numerical Computations (Fall '15,'16,'17,'18)
- CMSC 313: Computer Organization & Assembly Language Programming (Fall '14)
- CMSC 203: Discrete Mathematics (Fall '13)

*Computer Scientist* Jan. 2014 - Sep. 2014  
ParaTools Inc. Baltimore, MD  
Responsibilities:

- Consulting in parallel and distributed computing applications and architectures
- Participate in the design and development of the TAU profiling suite of tools

*Computational Scientist/Manager* Feb. 2009 - Oct. 2012  
NASA Center for Climate Simulation (NCCS) Greenbelt, MD  
NASA Goddard Space Flight Center  
Responsibilities:

- Managed the High Performance Computing User Services group for the NCCS.
- Provided computational science and software development support for NASA's Science Mission Directorate (SMD)
- Provide expertise in application optimization, tuning and benchmarking for NASA high performance computing (HPC) systems and applications.
- Provide HPC system performance analysis and architectural design recommendations.
- Research, design and develop new computational tools to enable high performance scientific computing.

*Computational Scientist*  
U.S. Army Engineer Research and Development Center  
DoD Supercomputing Resource Center (ERDC DSRC)

Jul. 2006 - Feb. 2009  
Vicksburg, MS

Responsibilities:

- Contribute in an advisory and research capacity to the Department of Defense High Performance Computing Modernization Program (DoD-HPCMP)
- Advise the HPCMP on annual acquisition of HPC systems for the DoD R,T&D community.
- Participate in inter agency discussion on performance measurement and analysis of HPC
- Develop application benchmark test packages for the DoD and the NSF Office of Cyberinfrastructure.
- Lead for the DoD-HPCMP TI benchmark package for Computational Chemistry and Ocean Modeling codes (GAMESS and HYCOM).
- Research Lead in designing specific application codes for new processor architectures (e.g., multi core), interprocessor communication networks, cache and memory hierarchies, I/O subsystems, and programming models. Measurements include level 1 and level 2 profiling of application codes. Analysis of the scalability of benchmarks and the suitability of alternative architectures for different application classes.

*Research Associate*  
Oak Ridge National Laboratory  
Computer Science and Mathematics Division, Computer Science Research Group

May 2005 - Jul. 2006  
Oak Ridge, TN

Responsibilities:

- Contributed to basic and applied research in the fields of high performance distributed operating systems, networking, and storage.
- Design and develop high performance distributed software solutions for the scientific computing community.
- Software development lead on the FreeLoader project, which is a distributed aggregate storage cache designed to maximize throughput of large data transfers over a LAN, WAN, Grid or cluster.

*Supercomputer Consultant*  
Mississippi Center for Supercomputing Research

Feb. 2001 - May 2005  
Oxford, MS

Responsibilities:

- Provide support for university researchers on the following DoD unclassified systems. SGI Altix 3700, 500 node Beowulf Linux Cluster, 8 node SGI Onyx 10000, 128 node SGI Origin 2800 and a 16 processor Cray C90.
- Documenting the installation, configuration and testing of the following software packages: Matlab, Gaussian (98, 03), NWchem, PGI compilers, OpenPBS, Blas, Scalapack libraries, OpenMP, MPI and the Globus Toolkit.
- Perform system benchmarking for application and HPC system optimization.

*Technical Writer*  
SAIR LINUX/GNU Certification Inc.

Feb. 1999 - Nov. 2001  
Oxford, MS

Responsibilities:

- Developed outlines and content for books, manuals (student, teacher), and comprehensive tests to demonstrate world class knowledge of the Linux operating system.
- Duties included thorough testing of all aspects of the Linux/GNU operating system from device drivers and memory management to configuring X windows.
- SAIR Linux & GNU Certification was the first company to provide vendor neutral Linux Certification, in 2001 we were purchased by Thomson Learning.

## PUBLICATIONS

### Journal Articles

1. Thomas Rolinger, **Tyler A. Simon**, Christopher D. Krieger, "Performance Considerations for Heterogeneous Distributed Tensor Decompositions" *Journal of Parallel and Distributed Computing*, Available online 2 November 2017, ISSN 0743-7315, <https://doi.org/10.1016/j.jpdc.2017.10.013>.
2. **Tyler A. Simon**, William A. Ward Jr., Alan P. Boss, "Performance Analysis of Intel Multiprocessors using Astrophysics Simulations", *Concurrency and Computation: Practice and Experience*, Wiley InterScience, vol. 24, no. 2, pp 155-166, Jan. 2012.
3. **Tyler A. Simon**, J. McGalliard, "Observation and Analysis of Multicore Performance Degradation in Scientific Applications", *Concurrency and Computation: Practice and Experience*, Wiley InterScience, vol. 21 no. 17, pp 2213-2231, Dec 2009.
4. S. Vazhkudai, X. Ma, V. Freeh, J. Strickland, N. Tammineedi, **Tyler A. Simon**, S.L. Scott, "Constructing Collaborative Desktop Storage Caches for Large Scientific Datasets", *ACM Transactions on Storage*, vol. 2 no. 3, pp 221-254, 2006.
5. R. Barnard, **Tyler A. Simon**, "Three Paradigms of Rational Agency", *Journal of Models and Modeling*, Vol. 1, No. 2 pp 31-52 April 2003.

### Conference Proceedings

1. Kaushik Velusamy, Thomas B. Rolinger, Janice McMahon, **Tyler A. Simon**, "Exploring Parallel Bitonic Sort on a Migratory Thread Architecture", *IEEE High Performance Extreme Computing Conference (HPEC)* Waltham MA, Sep. 2018.
2. Jee Choi, Xing Liu, Shaden Smith and **Tyler A. Simon**, "Blocking Optimization Techniques for Sparse Tensor Computation", *IEEE/ACM International Parallel and Distributed Processing Symposium (IPDPS)*, Vancouver, BC, May 2018.
3. Thomas Rolinger, **Tyler A. Simon**, Christopher Krieger, "Parallel Sparse Tensor Decomposition in Chapel", *Chapel Implementers and Users Workshop (CHI UW) IEEE/ACM IPDPS*, Vancouver, BC, May 2018.
4. Thomas Rolinger, **Tyler A. Simon**, Christopher Krieger, "An Empirical Evaluation of Allgather on Multi-GPU systems", *18th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (CCGRID)*, Washington, DC, May 2018.
5. Tom Henretty, Muthu Baskaran, James Ezick, David Bruns-Smith, **Tyler A. Simon**, "A Quantitative and Qualitative Analysis of Tensor Decompositions on Spatiotemporal Data", *IEEE High Performance Extreme Computing Conference (HPEC)* Waltham MA, Sep. 2017.
6. Thomas Rolinger, **Tyler A. Simon**, Christopher Krieger, "Performance Challenges for Heterogeneous Distributed Tensor Decompositions", *IEEE High Performance Extreme Computing Conference (HPEC)* Waltham MA, Sep. 2017.
7. Thomas Rolinger, **Tyler A. Simon**, Christopher Krieger, "Performance Evaluation of Parallel Sparse Tensor Decomposition Implementations", *Proceedings of the 6th Workshop on Irregular Applications: Architectures and Algorithms (IA<sup>3</sup>)* ACM, Salt Lake City, UT, 2016.
8. John Linford, **Tyler A. Simon**, Sameer Shende, Alan D. Malony, "Profiling Non-numeric OpenSHMEM Applications with the TAU Performance System", *Lecture Notes in Computer Science: OpenSHMEM and Related Technologies. Experiences, Implementations, and Tools*, vol. 8356, pp.105-119, Springer, Jan. 2014.

9. **Tyler A. Simon**, J. McGalliard, "Some Workload Scheduling Alternatives in a High Performance Computing Environment", Performance and Capacity by the Computer Measurement Group (CMG'13), La Jolla, CA Nov. 4-8, 2013 (**Best Paper award**).
10. **Tyler A. Simon**, John Dorband, "Improving Application Resilience through Probabilistic Task Replication", *International Workshop on Algorithmic and Application Error Resilience, at the ACM International Conference on Supercomputing (ICS'13)*, ACM, Eugene, OR, June 11, 2013.
11. D. Chapman, **Tyler A. Simon**, P. Nguyen, M. Halem, "A Data Intensive Statistical Aggregation Engine: A Case Study for Gridded Climate Records", *27th IEEE International Parallel and Distributed Processing Symposium Workshops, (CloudFLOW'13)*, IEEE, Boston MA, May 13, 2013.
12. **Tyler A. Simon**, P. Nguyen, M. Halem, "Multiple Objective Scheduling of HPC Workloads through Dynamic Prioritization", *Proceedings of the 22nd High Performance Computing Symposia (HPC13), SpringSim 2013*, Society for Computer Simulation International/ACM, San Diego, CA, Apr. 7-10, 2013.
13. P. Nguyen, **Tyler A. Simon**, M. Halem, D. Chapman, Q. Li, "A Hybrid Scheduling Algorithm for Data Intensive Workloads in a Map Reduce Environment", *5th IEEE/ACM International Conference on Utility and Cloud Computing (UCC'12)*, ACM/IEEE, Chicago, IL, Nov. 2012.
14. **Tyler A. Simon**, W. A. Ward Jr., A. Boss, "Performance Analysis of Intel Multicore Processors using Astrophysics Simulations", *2nd Workshop on the Frontiers of Multicore Computing*, Baltimore, MD Sep. 2010.
15. **Tyler A. Simon**, J. McGalliard, "Benchmark Analysis of Multicore Processor Memory Contention", *35th International Conference of the Computer Measurement Group (CMG '09)*, Dallas, TX, Dec. 2009.
16. **Tyler A. Simon**, S. Cable, M. Mahmoodi, "Application Scalability and Performance on Multicore Architectures", *Proceedings of the Department of Defense HPC User Group Conference*. Pittsburgh, PA. June 2007.
17. X. Ma, S. Vazhkudai, V. Freeh, **Tyler A. Simon**, T. Yang, S. L. Scott, "Coupling Prefix Caching and Collective Downloads for Remote Dataset Access", *Proceedings of the 20th ACM International Conference on Supercomputing*, pp. 229-238, June 2006.
18. R. Barnard, **Tyler A. Simon**, "Three Paradigms of Rational Agency", *Language, Logic and Logistics: Agent Modeling and Cross-Disciplinary Discourse*, Physical Sciences Laboratory, New Mexico State University, Las Cruces, NM, January 2002.
19. **Tyler A. Simon**, "Knowledge Representation and Acquisition in Agent Based Systems", *ACM Mid-Southeast Chapter Fall Conference*, Gatlinburg, TN, November 16-17, 2000.

## Books (as technical contributor)

1. SAIR Development Team, "SAIR Linux and GNU Certification Level 2: Samba and Resource Sharing". John Wiley & Sons, 2002.
2. SAIR Development Team, "SAIR Linux and GNU Certification Level 2: Apache and Web Servers". John Wiley & Sons, 2002.
3. SAIR Development Team, "SAIR Linux and GNU Certification Level 2: Core Concepts and Practices". John Wiley & Sons, 2002.
4. T. Maginnis, "SAIR Linux and GNU Certification: Installation and Configuration", eds. 1,2. John Wiley & Sons, 2000, 2001.
5. T. Maginnis, "SAIR Linux and GNU Certification: System Administration", ed. 1. John Wiley & Sons, 2001.
6. T. Maginnis, "SAIR Linux and GNU Certification: Networking", ed. 1. John Wiley & Sons, 2001.

7. T. Maginnis, "SAIR Linux and GNU Certification: Security, Ethics, and Privacy", ed. 1. John Wiley & Sons, 2001.

## Workshops/Tutorials

1. Enabling Sparse Matrix Computations in Multi-locale Chapel, by Amer Tahir, Milton Halem, **Tyler Simon**, Chapel Implementers and Users Workshop, IPDPS'16, Chicago, IL, May 2016.
2. A Statistical Aggregation Engine for Climatology and Trend Analysis, by David R. Chapman, **Tyler Simon** and Milton Halem, American Geophysical Union (AGU), San Francisco, CA. Dec. 15, 2014.
3. Performance Programming for Multi core Architectures, by **Tyler Simon**, Tom Oppe, Brain Waldecker, Alan Minga. *Tutorial: Department of Defense User Group Conference*. Pittsburgh, PA. June 2007.
4. Compiler Optimizations on the Cray XT3, 1st Annual Cray Technical Workshop, Nashville TN. February 2007.
5. Parallel Programming with MPI and C, by Jason Hale and **Tyler Simon**, *Workshop: ACM Mid-South College Computing Conference*, Little Rock, AR April 2004.

## Invited Presentations (professional talks without an associated publication)

1. Tensor Analysis of Spatiotemporal Data, Chesapeake Large Scale Analytics Conference, Annapolis MD Oct. 2017
2. Using Game Theory with Multiple Objective Prioritization for HPC Workloads, CMG Regional meetings, Raleigh and Richmond, April 2014
3. Workload Scheduling Alternatives for Large Scale HPC systems, Computer Measurement Group(CMG) Southeast Meeting, April 26, 2013
4. A Novel Dynamic Task Scheduling Environment for High Performance Distributed Systems, UMBC CSEE Colloquium, Sep. 2012
5. A Scalable, Fault Tolerant Programming Model for Developing Data Intensive Parallel Applications, UMBC CSEE Colloquium, Feb. 2012
6. Designing Scientific Applications for Cache-Reuse on Multicore HPC systems, Oak Ridge National Laboratory National Center for Computational Sciences (NCCS), June 2008.
7. Performance Profiling of DoD Applications, The University of Oregon Department of Computer Science, Eugene, OR January 2008.
8. Effects of Loop Blocking for Cache Reuse on AMD Opteron HPC Systems", Department of Defense HPC User Group Conference, Seattle July 2008.
9. FreeLoader: A Parallel Storage Aggregation System for Scientific Data, Oak Ridge National Laboratory, Computer Science and Mathematics Division, July 2006.
10. Design and Performance of the FreeLoader Distributed Storage System, U.S. Army Corps of Engineers, Engineer Research and Development Center, Major Shared Resource Center, (U.S. Army ERDC MSRC) Vicksburg, MS. March 2006.
11. Performance Analysis and Benchmarking of Heterogeneous Clusters, U.S. Army Corps of Engineers, Engineer Research and Development Center, Major Shared Resource Center, (U.S. Army ERDC MSRC) Vicksburg, MS. January 2005.
12. Parallel Programming with MPI, Computer Science Seminar Series. University of Mississippi, Oxford, MS. April 2005.
13. On Mary West's Contextual Truth: The Subjectivity of Objective Science, Mississippi Philosophical Association's Annual Meeting. Oxford, MS April 2003.

## Posters

1. Tyler A. Simon, "MPI Scaling Issues with Intel-MPI and MVAPICH2", *Supercomputing 2010*, New Orleans, LA Nov. 2010 (NASA booth demonstration and presentation).
2. Tyler A. Simon, "Optimizing Computational Chemistry Applications on Linux Clusters", *Southeast Theoretical Chemistry Association's (SETCA) Annual Meeting*, Oxford, MS, May 2004.
3. Tyler A. Simon, "Using Linear Algebra for Benchmarking Clusters", *SIGMA XI Research Symposium*, Oxford, MS, April 2004. (1st prize: Best CS and Mathematics Poster)

## Service and Awards

- 2018, Technical Program Committee, IEEE High Performance and Extreme Computing Conference (HPEC)
- 2016, 2017, 2018 Organizing Committee, Chesapeake Large-Scale Analytics Conference (CLSAC)
- 2016, 2017 Technical Program Committee, International Symposium on Computer Architecture and High Performance Computing (SBAC-PAD)
- 2016, Technical Program Committee, Supercomputing (SC'16)
- 2016, Technical Program Committee, International Conference on Parallel Processing (ICPP)
- 2015, Technical Program Committee, International Conference on Partitioned Global Address Space Programming Models (PGAS)
- 2015-present DoD High Performance Computing Modernization Program Advisory Panel (HPCAP) and Executive Steering Committee
- 2014, 2015, 2017 NSF Panelist
- 2013, Best Paper Award, International Conference of the Computer Measurement Group
- 2010, NASA Robert H. Goddard Exceptional Achievement Team Award for Science
- 2009, CSC High Performance Computing Center of Excellence SOAR award
- 2005, ORAU post graduate research fellowship, Oak Ridge National Laboratory
- 2004, First Prize, Best Computer Science and Mathematics Poster, Sigma Xi Research Symposium, University of Mississippi
- 2004, First Prize, Best Computer Science and Mathematics paper, Mississippi Academy of Sciences Annual Conference
- 2003-2005, Graduate Research Fellowship, Mississippi Center for Supercomputing Research
- 2003, Graduate Teaching Assistantship, University of Mississippi department of Philosophy
- 2001, Certificate of Graduation, The Goethe Institute, Munich, Germany