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RESEARCH INTERESTS

Experimental systems, broadly construed; operating systems, middleware, I/O and storage, security and privacy, high-performance computing; application domains including computational science, biomedical informatics, enterprise and pervasive computing.

PROFESSIONAL PREPARATION

Doctor of Philosophy, Computer Science, 2005, Georgia Institute of Technology, Atlanta, GA.

Master of Computer Science, 1992, University of Virginia, Charlottesville, VA.

Bachelor of Science (with distinction in Computer Science), 1990, James Madison University, Harrisonburg, VA.

APPOINTMENTS

Principal Member of Technical Staff January 2012 - present
Center for Computing Research, Sandia National Laboratories, Albuquerque NM

Research Associate Professor February 2015 - present
Department of Computer Science, University of New Mexico, Albuquerque NM

Assistant Professor (Research Track), Department of Biomedical Informatics October 2009 - December 2011
Senior Research Scientist, Center for Comprehensive Informatics
Emory University, Atlanta, GA

Research Assistant Professor January 2009 - October 2009
Department of Computer Science, University of New Mexico, Albuquerque, NM

Postdoctoral Research Fellow September 2005 - December 2008
Department of Computer Science, University of New Mexico, Albuquerque, NM

PUBLICATIONS

Journal Articles

1. Patrick M. Widener, Kurt B. Ferreira, Scott L. Levy and Torsten Hefler. 'On noise and the performance benefits of nonblocking collectives'. In *International Journal of High-performance Computing* 30 (1), 2016, pp.121-133.
2. Lee Cooper, Alexis Carter, Alton Farris, Fusheng Wang, Jun Kong, David Gutman, Patrick Widener, Tony Pan, Sharath Cholleti, Ashish Sharma, Tahsin Kurc, Daniel Brat and Joel Saltz. 'Digital pathology: data-intensive frontier in medical imaging'. In *Proceedings of the IEEE* 100 (4), April, 2012, pp.991-1003.
3. Lee Cooper, Jun Kong, David Gutman, Fusheng Wang, Sharath Cholleti, Tony Pan, Patrick Widener, Ashish Sharma, T. Mikkelsen, A. Flanders, D. Rubin, Erwin Van Meir, Tahsin Kurc, Carlos Moreno, Dan Brat and Joel Saltz. 'An integrative approach for in silico glioma research'. In *IEEE Transactions on Biomedical Engineering*, 2010.

4. Patrick M. Widener, Matthew Wolf, Hasan Abbasi, Scott McManus, Mary Payne, Patrick G. Bridges, Karsten Schwan, Jack Pullikottil and Matthew Barrick. 'Exploiting Latent I/O Asynchrony in Petascale Science Applications'. In *International Journal of High Performance Computing*, 2010.
5. Rolf Riesen, Ron Brightwell, Patrick Bridges, Trammell Hudson, Arthur Maccabe, Patrick Widener and Kurt Ferreira. 'Designing and Implementing Lightweight Kernels for Capability Computing'. In *Concurrency and Computation: Practice and Experience* 21 (6), April, 2009, pp.793-817.
6. Patrick Widener, Greg Eisenhauer, Karsten Schwan and Fabian E. Bustamante. 'Open Metadata Formats: Efficient XML-Based Communication for High-Performance Computing'. In *Cluster Computing: The Journal of Networks, Software Tools, and Applications* (5), 2002, pp.315-324. Invited submission.

Book Chapters

1. Joel Saltz, Fusheng Wang, George Teodoro, Lee Cooper, Patrick Widener, Jun Kong, David Gutman, Tony Pan, Sharath Cholleti, Ashish Sharma, Daniel Brat and Tahsin Kurc. "Large-scale microscopy imaging analytics for in silico biomedicine" in *Data-Intensive Science*, Terence Critchlow and Kerstin Kleese van Dam (eds.), CRC Press, 2013.
2. Patrick Widener, Tahsin Kurc, Wenjin Chen, Fusheng Wang, Lin Yang, Jun Hu, Vijay Kumar, Vicky Chu, Lee Cooper, Jun Kong, Ashish Sharma, Tony Pan, Joel Saltz and David Foran. "High performance computing techniques for scaling image analysis workflows". In *Applied parallel and scientific computing*, Springer Berlin Heidelberg, 2012, pp.67-77. LNCS 7134.
3. Fusheng Wang, Tahsin Kurc, Patrick Widener, Tony Pan, Jun Kong, Lee Cooper, David Gutman, Ashish Sharma, Sharath Cholleti, Vijay Kumar and Joel Saltz. "High-performance systems for in silico microscopy imaging studies". In *Data integration in the life sciences*, Springer, 2010, pp.3-18. LNCS 6254.
4. Ron Oldfield, Todd Kordenbrock and Patrick M. Widener. "Data-Movement Approaches for High Performance Computing Storage Systems" in *Attaining High Performance Communications: A Vertical Approach*, Ada Gavrilovska (ed.), CRC Press, 2009.
5. Karsten Schwan, Brian F. Cooper, Greg Eisenhauer, Ada Gavrilovska, Matt Wolf, Hasan Abbasi, Sandip Agarwala, Zhongtang Cai, Vibhore Kumar, Jay Lofstead, Mohamed Mansour, Balasubramanian Seshasayee and Patrick Widener. "AutoFlow: Autonomic Information Flows for Critical Information Systems" in *Autonomic Computing: Concepts, Infrastructure, and Applications*, Manish Parashar and Salim Hariri (eds.), CRC Press, 2006.

Refereed Conference/Workshop Publications

1. Oscar H. Mondragon, Patrick G. Bridges, Scott Levy, Kurt B. Ferreira and Patrick Widener. "Scheduling in-situ analytics in next-generation applications". In *Proc. 16th International Symposium on Cluster, Cloud, and Grid Computing (CCGrid 2016)*, Cartagena, Colombia: IEEE/ACM, May, 2016. To appear.
2. Patrick M. Widener, Kurt B. Ferreira, Scott Levy and Torsten Hefler. "Canaries in a coal mine: using application checkpoints to detect memory failures". In *Proc. Workshop on Resiliency in High-Performance Computing*, Vienna, Austria, August, 2015. Associated with EuroPar 2015.
3. Kurt B. Ferreira, Scott L. Levy, Patrick M. Widener, Dorian C. Arnold and Torsten Hoeffler. "Understanding the effects of communication and coordination on checkpointing at scale". In *Proceedings of the 2014 IEEE/ACM International Conference for High Performance Computing, Networking, Storage and Analysis (Supercomputing '14)*, New Orleans, Louisiana: IEEE/ACM, November, 2014.
4. Patrick M. Widener. "Data fusion as an enterprise service". In *Proceedings of IEEE Services Computing*, Anchorage, Alaska: IEEE, June, 2014.
5. Patrick M. Widener, Kurt B. Ferreira, Scott L. Levy and Torsten Hoeffler. "Understanding the effect of noise on the performance benefit of nonblocking allreduce at scale". In *Proceedings of the 21st European MPI Users Group Meeting (EuroMPI)*, Kyoto, Japan: ACM/SIGHPC, September, 2014.

6. Adam Crume, Carlos Maltzhan, Lee Ward, Thomas Kroeger, Matthew Curry, Ron Oldfield and Patrick Widener. "Fourier-assisted machine learning of hard disk drive access time models". In *Proc. 8th Parallel Data Storage Workshop*, Denver, Colorado, November, 2013. Held in conjunction with Supercomputing 2013.
7. Scott Levy, Bryan Topp, Kurt Ferreira, Dorian Arnold, Torsten Hoefer and Patrick Widener. "Using simulation to evaluate the performance of resilience strategies at scale". In *Proc. 4th International Workshop on Performance Modeling, Benchmarking and Simulation of High Performance Computer Systems (PMBS13)*, Denver, Colorado: ACM/IEEE, November, 2013. Held in conjunction with Supercomputing 2013.
8. Patrick Widener, Kurt Ferreira, Scott Levy, Dorian Arnold, Patrick Bridges and Ron Brightwell. "Asking the right questions: benchmarking fault-tolerant extreme-scale systems". In *Proc. Workshop on Resiliency in High-Performance Computing*, Aachen, Germany, August, 2013. Held in conjunction with EuroPar 2013.
9. George Teodoro, Tahsin Kurc, Tony Pan, Lee Cooper, Jun Kong, Patrick Widener and Joel Saltz. "Accelerating large scale image analyses on parallel, CPU-GPU equipped systems". In *Proc. 26th International Parallel and Distributed Processing Symposium*, Shanghai, China: IEEE, May, 2012.
10. Jun Kong, Lee Cooper, Fusheng Wang, Candace Chisholm, Carlos Moreno, Tahsin Kurc, Patrick Widener, Daniel Brat and Joel Saltz. "A comprehensive framework for classification of nuclei in digital microscopy imaging: an application to diffuse gliomas". In *Proc. IEEE International Symposium on Biomedical Imaging*, Chicago, Illinois: IEEE, April, 2011.
11. Fusheng Wang, Tahsin Kurc, Patrick Widener, Tony Pan, Jun Kong, Lee Cooper, David Gutman, Ashish Sharma, Sharath Cholleti, Vijay Kumar and Joel Saltz. "High-performance systems for in silico microscopy imaging studies". In *Proc. Seventh International Conference on Data Integration in the Life Sciences*, Gothenburg, Sweden, August, 2010.
12. Tahsin Kurc, Patrick Widener, Wenjin Chen, Fusheng Wang, Lin Yang, Jun Hu, Vijay Kumar, Vicky Chu, Lee Cooper, Jun Kong, Ashish Sharma, Tony Pan, Joel H. Saltz and David J. Foran. "Grid-enabled, high-performance microscopy image analysis". In *Proc. Second International Workshop on High-Performance Medical Image Computing for Image-Assisted Clinical Intervention and Decision-Making*, Beijing, China, September, 2010.
13. Patrick Widener, Tahsin Kurc, Wenjin Chen, Fusheng Wang, Lin Yang, Jun Hu, Vijay Kumar, Vicky Chu, Lee Cooper, Jun Kong, Ashish Sharma, Tony Pan, Joel H. Saltz and David J. Foran. "High performance computing techniques for scaling image analysis workflows". In *Proc. Para 2010: State of the Art in Scientific and Parallel Computing*, Reykjavik, Iceland, 2010.
14. Manjunath Gorentla Venkata, Patrick G. Bridges and Patrick M. Widener. "Using Application Communication Characteristics to Drive Dynamic MPI Reconfiguration". In *Proceedings of the 9th International Workshop on Communications Architecture for Clusters (CAC 2009)*, Rome, Italy, May, 2009. Held in conjunction with IPDPS 2009.
15. Patrick M. Widener, Matthew Wolf, Hasan Abbasi, Scott McManus, Mary Payne, Patrick G. Bridges and Karsten Schwan. "Exploiting Latent I/O Asynchrony in Petascale Science Applications". In *Proceedings of the 2nd International Workshop on Parallel Programming Models and Systems Software for High-End Computing (P2S2)*, Vienna, Austria, September, 2009. Held in conjunction with ICPP 2009.
16. James Horey, Jean-Charles Tournier, Patrick Widener, Arthur Maccabe and Ann Kilzer. "A Filesystem Interface for Sensor Networks". In *Proc. Fifth Workshop on Embedded Networked Sensors (HotEm-Nets)*, Charlottesville, Virginia: ACM, June, 2008.
17. Jiantao Kong, Ivan Ganey, Karsten Schwan and Patrick Widener. "CameraCast: Flexible Access to Remote Video Sensors". In *Proc. Fourteenth Annual Multimedia Computing and Networking Conference (MMCN'07)*, San Jose, California, January, 2007.
18. Jiantao Kong, Karsten Schwan and Patrick Widener. "Protected Data Paths: Delivering Sensitive Data via Untrusted Proxies". In *Proc. 2006 International Conference on Privacy, Security and Trust (PST 2006)*, Ontario, Canada, October, 2006.

19. Vibhore Kumar, Zhongtang Cai, Brian F. Cooper, Greg Eisenhauer, Karsten Schwan, Mohamed Mansour, Balasubramanian Sheshasayee and Patrick Widener. "IFLOW: Resource-aware Overlays for Composing and Managing Distributed Information Flows". In *Proc. European Conference on Computer Systems (EuroSys)*, Leuven, Belgium, April, 2006.
20. Ron A. Oldfield, Patrick Widener, Arthur B. Maccabe, Lee Ward and Todd Kordenbrock. "Efficient Data Movement for Lightweight I/O". In *Proc. 2006 Workshop on high-performance I/O techniques and deployment of Very-Large Scale I/O Systems (HiPerl/O 2006)*, Barcelona, Spain, September, 2006.
21. Ron A. Oldfield, Arthur B. Maccabe, Sarala Arunagiri, Todd Kordenbrock, Rolf Riesen, Lee Ward and Patrick Widener. "Lightweight I/O for Scientific Applications". In *Proc. 2006 IEEE Conference on Cluster Computing*, Barcelona, Spain, September, 2006.
22. Zhongtang Cai, Vibhore Kumar, Karsten Schwan, Brian F. Cooper, Greg Eisenhauer, Mohamed Mansour, Balasubramanian Sheshasayee and Patrick Widener. "Implementing Diverse Messaging Models with Self-Managing Properties using IFLOW". In *Proc. 3rd IEEE International Conference on Automatic Computing*, Dublin, Ireland, June, 2006.
23. Patrick Widener. "Reverb: Middleware Support for Distributed Application Forensics". In *Proc. IEEE Workshop on Challenges for Large Distributed Environments*, Research Triangle Park, North Carolina, July, 2005.
24. Balasubramanian Sheshasayee, Karsten Schwan and Patrick Widener. "SOAP-binQ: High-Performance SOAP with Continuous Quality Management". In *Proc. 24th International Conference on Distributed Computing Systems (ICDCS 2004)*, Tokyo, Japan, March, 2004.
25. Yair Wiseman, Karsten Schwan and Patrick Widener. "Efficient End-to-End Data Exchange Using Configurable Compression". In *Proc. 24th International Conference on Distributed Computing Systems (ICDCS 2004)*, Tokyo, Japan, March, 2004.
26. Patrick Widener, Karsten Schwan and Fabian Bustamante. "Differential Data Protection in Dynamic Distributed Applications". In *Proc. Annual Computer Security Applications Conference*, Las Vegas, Nevada, December, 2003.
27. Fabian Bustamante, Patrick Widener and Karsten Schwan. "Scalable Directory Services Using Proactivity". In *Proc. IEEE/ACM Supercomputing*, Baltimore, Maryland, November, 2002.
28. Fabian Bustamante, Greg Eisenhauer, Patrick Widener, Karsten Schwan and Calton Pu. "Active Streams: An approach to adaptive distributed systems". In *Proc. 8th Workshop on Hot Topics in Operating Systems (HotOS-VIII)*, Elmau/Oberbayern, Germany, May, 2001.
29. Beth Plale, Patrick Widener and Karsten Schwan. "Taking the Step from Meta-Information to Communication Middleware in Computational Data Streams". In *Proc. IEEE Heterogeneous Computing Workshop (at IPDPS 2001)*, San Francisco, California, April, 2001.
30. Patrick Widener, Greg Eisenhauer and Karsten Schwan. "Open Metadata Formats: Efficient XML-Based Communication for High-Performance Computing". In *Proc. Tenth International IEEE Symposium on High Performance Distributed Computing (HPDC-10)*, San Francisco, California, August, 2001.
31. Fabian Bustamante, Greg Eisenhauer, Karsten Schwan and Patrick Widener. "Efficient Wire Formats for High-Performance Computing". In *Proc. IEEE/ACM Supercomputing*, Dallas, Texas, November, 2000.
32. Beth Plale, Greg Eisenhauer, Lynn K. Daley, Patrick Widener and Karsten Schwan. "Fast Heterogeneous Binary Data Interchange for Event-based Monitoring". In *International Conference on Parallel and Distributed Computing and Systems (PDCS-2000)*, Las Vegas, Nevada, November, 2000.
33. Charles W. Reynolds and Patrick Widener. "A Study of the Support of the Programming Language C++ for Generic Abstract Data Types". In *Proc. Fourth National Conference on Undergraduate Research*, Schenectady, New York, April, 1990.

Dissertation

1. Patrick Widener. *Dynamic Differential Data Protection for High-Performance and Pervasive Applications*. Ph.D. Dissertation, College of Computing, Georgia Institute of Technology, August, 2005.

TEACHING EXPERIENCE

Instructor, Department of Computer Science, Emory University	Fall 2011
Prepared syllabus, reading list, class lectures, projects and exams for CS 584, "Introduction to High Performance Computing".	
Instructor, Department of Computer Science, University of New Mexico	Spring 2007
Prepared syllabus, reading list, class lectures, projects and exams for CS 481, "Digital Computer Operating Systems".	
Instructor, College of Computing, Georgia Institute of Technology	Summer 2002
Prepared syllabus, reading list, class lectures, projects and exams for CS 4210, "Advanced Operating Systems".	
Guest Lecturer, College of Computing, Georgia Institute of Technology	2001 - 2005
Multiple lectures on varied material for CS 6210, "Advanced Operating Systems" graduate course.	
Teaching Assistant, College of Computing, Georgia Institute of Technology	1998 - 1999
Instructor, Continuing Education Department, College of Computing, Georgia Institute of Technology	2001

PROFESSIONAL SERVICE

Program Committee Member, IEEE/ACM Supercomputing (2016,2015,2010), IEEE International Parallel and Distributed Processing Symposium (2014), ACM International Conference on Supercomputing (2011), ACM International Health Informatics Symposium (2010-11), International Workshop on Scalable Stream Processing Systems (2010), ACM International Conference on Computing Frontiers (2006).

Paper Referee, ACM International Conference on Supercomputing, IEEE/ACM Supercomputing, ACM Symposium on Operating Systems Principles, IEEE International Symposium on Cluster Computing, IEEE Symposium on High Performance Distributed Computing, IEEE International Parallel and Distributed Processing Symposium, Journal of Grid Computing.

Senior Member, Association for Computing Machinery; *Member*, IEEE Computer Society

Academic degree program evaluator for Computing Sciences Accreditation Board/ABET

OTHER PROFESSIONAL EXPERIENCE

Graduate Research Assistant	May 1999 - August 2005
College of Computing, Georgia Institute of Technology, Atlanta, GA	
Software Developer, Universal Systems, Inc., Chantilly VA	Mar 1998 - Aug 1998
Technical Lead / Specialist, Bell Atlantic Network Services, Inc., Silver Spring, MD	Sep 1996 - Mar 1998
Programmer/Analyst, American Management Systems, Fairfax VA	Sep 1992 - Aug 1996

OTHER INFORMATION

Active Department of Energy "Q" security clearance