Sean J. Wallace

CONTACT INFORMATION

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RESEARCH INTERESTS

Operating systems software development, parallel computing programming languages, high-performance computing especially leadership class systems, network and software security, and cloud systems.

EDUCATION

Ph.D. Candidate, Computer Science August 2012 - May 2017
Thesis: Power Profiling, Analysis, Learning, and Management for High-Performance Computing
Thesis Advisers: Dr. Zhiling Lan (IIT) and Dr. Michael E. Papka (ANL)
Illinois Institute of Technology, Chicago, IL, USA

B.S., Computer Science, *cum laude* May 2011
Minor: Information Technology and Management
Illinois Institute of Technology, Chicago, IL, USA

PUBLICATIONS

[1] **Sean Wallace**, Zhou Zhou, Venkatram Vishwanath, Susan Coghlan, John Tramm, Zhiling Lan, and Michael E. Papka. Application power profiling on IBM Blue Gene/Q. *Parallel Computing*, 57:73 – 86, 2016.

[2] **Sean Wallace**, Xu Yang, Venkatram Vishwanath, William E. Allcock, Susan Coghlan, Michael E. Papka, and Zhiling Lan. A data driven scheduling approach for power management on HPC systems. In *Proceedings of SC16: International Conference for High Performance Computing, Networking, Storage and Analysis*, SC '16, Salt Lake City, USA, 2016. ACM.

[3] Li Yu, Zhou Zhou, **Sean Wallace**, Michael E. Papka, and Zhiling Lan. Quantitative modeling of power performance tradeoffs on extreme scale systems. *Journal of Parallel and Distributed Computing*, 2015.

[4] **Sean Wallace**, Venkatram Vishwanath, Susan Coghlan, Zhiling Lan, and Michael E. Papka. Comparison of vendor supplied environmental data collection mechanisms. In *2015 IEEE International Conference on Cluster Computing (CLUSTER)*, pages 690–697, Sept 2015.

[5] Erich J. Petushek, Edward T. Cokely, Paul Ward, John J. Durocher, **Sean Wallace**, and Gregory D. Myer. Injury risk estimation expertise: Assessing the ACL injury risk estimation quiz. *The American Journal of Sports Medicine*, 2015.

[6] Erich J. Petushek, Edward Cokely, Paul Ward, and **Sean Wallace**. Expert injury risk assessment: Investigating the ACL-IQ. In *Society for Judgment and Decision Making*, Long Beach, CA., 2014.

[7] Eduardo Berrocal, Li Yu, **Sean Wallace**, Michael E. Papka, and Zhiling Lan. Exploring void search for fault detection on extreme scale systems. In *Cluster Computing (CLUSTER), 2014 IEEE International Conference on*, pages 1–9, Sept 2014. (Best Paper Award).

[8] Xu Yang, Zhou Zhou, **Sean Wallace**, Zhiling Lan, Wei Tang, Susan Coghlan, and Michael E. Papka. Integrating dynamic pricing of electricity into energy aware scheduling for HPC systems. In *Proceedings of SC13: International Conference for High Performance Computing, Networking, Storage and Analysis*, SC '13, pages 60:1–60:11, Denver, USA, 2013. ACM.

[9] **Sean Wallace**, Venkatram Vishwanath, Susan Coghlan, John Tramm, Zhiling Lan, and Michael E. Papka. Application power profiling on IBM Blue Gene/Q. In *2013 IEEE International Conference on Cluster Computing (CLUSTER)*, pages 1–8, Sept 2013.

[10] **Sean Wallace**, Venkatram Vishwanath, Susan Coghlan, Zhiling Lan, and Michael E. Papka. Measuring power consumption on IBM Blue Gene/Q. In *The Ninth Workshop on High-Performance, Power-Aware Computing, 2013 (HPPAC'13)*, Boston, USA, May 2013.

Teaching

Operating Systems Fall 2015 - Summer 2016

- Responsible for course design, syllabus, lectures, assignments, exams, and the assignment of grades.
- Maintained an average student rating of 4.38/5.00 throughout three semesters from 172 total students.

Research Awards

Illinois Institute of Technology - Starr Fellowship 2014

Awarded Starr Research Fellowship in the amount of $15,000.00 for the Spring and Fall 2014 semesters to research power characteristics of heterogeneous systems, especially those containing co-processors/accelerators. Resulted in the extension of existing power-profiling library to support these systems, detailed analysis of applications and benchmarks designed especially for these systems, and comparison of the performance and power profiles various classes of algorithms exhibit on these hardware systems.

Argonne National Laboratory - Research Assistant August 2012 - Present

Awarded research assistantship to work with Argonne National Laboratory studying fault tolerance, energy aware scheduling, and other aspects of in-house supercomputers. Resulted in detailed analysis of power consumption for real scientific applications spanning multiple years, the development of a user-level power-profiling library, and the integration of power data with learning techniques to develop a new scheduler based on the unique power profiles of the applications.

Illinois Institute of Technology - Undergraduate Summer Research Summer 2010

Awarded an Undergraduate Summer Research Stipend to work with assistant professor of linguistics on developing systematic measures and tools to assess the effect of hyperarticulated (exaggerated) speech on voice recognition software. Developed voice recognition tool that detects hyperarticulated speech and in most cases was able to recover from otherwise catastrophic errors in speech streams.

Internships

Cancer Treatment Centers of America Summer 2009

- Developed Research and Development software used to track patient quality of life. Among the most prominent assets to the software is the dynamic report generation. This feature allows statisticians to select exactly which data points they wish to view and stratify based upon as many conditions as desired.
- Within a month's time a comprehensive software system was developed that vastly outperformed the initial scope of the project so much so that it's currently being integrated in the CTCA corporate network for use at all facilities.

Personal Projects

Illinois Institute of Technology - OpenStack Cluster 2016

- Organized disjoint, overly complex, and underutilized computing systems at the university within the computer science department into a single cloud platform based on OpenStack. Cluster consists of over 200 cores, 300 GB of RAM, and 30 TB of distributed storage.
- The primary goal was to establish a system which not only would be easy to use but complete in what it offered. This includes optimizing for parallel programs (such as MPI) by building parallel file systems like CephFS on top of the Ceph distributed block store and affording access to acceleration hardware (such as NVIDIA general purpose GPU's and Intel Xeon Phi's).
- The secondary goal was to ensure continued operation by decreasing the overhead associated with administration and maintenance. Ubuntu Metal as a Service (MAAS) is used for hardware provisioning and Canonical Juju is used for modeling the cluster and automated configuration

which allows OpenStack services to be deployed to the nodes in the cluster.

Work History

ODIN International, Inc. 1999 to 2012

IT Director

- Oversaw every computer in house including servers and workstation computers. Responsible for the well being of the network as well as the constant security of the data.
- Complete network build up from ground level including ordering of correct server technology; setup of operating systems and applications including: Microsoft Server, Exchange Server, Ubuntu Linux, Redhat Linux, Sendmail, Postfix, Apache Web Server, MySQL, and various Symantec anti-viral solutions; and configuration of over 20 client computers.
- Website development which included solo design and coding of well over 200 sites.

ASGARD Web Services 2004 to 2012

Owner

- Started company when 16 years old and established very positive relationships with multiple clients for whom a broad range of services from website design to datacenter server administration were carried out.
- Positive track record of over 20 notable clients with a ranging necessity of solutions; everything from basic design to full extranet/intranet solutions hosted on systems also internally designed.

Technical Expertise

Operating Systems
: UNIX/Linux (Gentoo, Ubuntu, Fedora, RHLE), Mac OS, Windows

Database Servers
: MySQL, MSSQL, PostgreSQL, SQLite

Office Suites
: Microsoft Office, OpenOffice, LaTeX

Integrated Development Environments
: Eclipse, Visual Studio, Xcode

Version Tracking
: Git, Subversion, Trac

Programming Languages
: C, C++, Objective-C, C#, Java, SQL, XML/JSON, Perl, Python, JavaScript, PHP, ASP.NET

Mobile Development
: iPhone, Android

Job Scheduling Systems
: Cobalt (Argonne National Laboratory), Slurm

Cloud Platforms
: OpenStack, Amazon Web Services, Microsoft Azure