

## **Zachary H. Jones, Ph.D.**

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### **SUMMARY**

I am looking to leverage computer science and performance analysis expertise to tackle challenging computation problems. I am seeking an environment to innovate and assume leadership roles. My research interests are quite broad and include virtualization, operating systems, HPC, computer architectures, graphics, and appreciation of algorithms.

### **WORK EXPERIENCE**

#### **IBM**

##### **Software Engineer**

**May 2007 – Present**

**Durham, NC**

I launched research into the performance and scalability of WebSphere Application Server (WAS) on highly concurrent parallelized processors, analyzed and improved the performance of static file serving. The research used SPECWeb 2005 benchmark (which realistically models the behavior of web browsers and backend databases) for measuring and gathering results. I worked jointly with researchers from IBM Research exchanging ideas, results, and information.

I expanded research into the performance and scalability of WAS to include virtualized environments. Results were collected and analyzed from WAS running in VMWare ESX, IBM PowerVM, Solaris Zones, and outside of virtualized environments. I built a framework for the automated running of tests of WAS in the different environments. This included the evaluation of several performance analysis and monitoring tools for their usefulness with performance research

I further analyzed WAS for lock contentions and code paths that could be shortened to yield improvements in scalability performance. I performed performance analysis on WebSphere Extreme Scale that resulted in significant performance improvements. I identified, prototyped, and delivered performance enhancements into the product. The integration of the performance improvements required interacting and coordinating with multiple teams to manage the code deliverables to ensure timely integration.

#### **School of Computing, Clemson University**

##### **Graduate Research Assistant**

**Aug. 2007 – Nov. 2010**

**Clemson, SC**

I conducted research exploring the design of a framework for virtual device driver development and virtual device-based performance modeling. The goal is to minimize overhead of modify the Linux kernel and allowing modularity, flexibility, and ease of design for the addition of device or throttle device to modeling given performance characteristics. The virtual framework is being used for a graduate class project where students are tasked with writing a graphics driver for a virtual graphics card using the framework.

I conducted research into high performance computing topics primarily centering on the Cell Broadband Engine. This included implementing Lattice-Boltzmann methods (simulate fluid-flow and other associated transport phenomena) on the Cell Broadband Engine. This was followed with a performance comparison of NVIDIA CUDA, Cell Broadband Engine, and traditional Intel x86/x86\_64 based architectures.

#### **Toyota Racing Development**

##### **Research Intern**

**Summer 2010**

**Salisbury, NC**

I applied algorithmic, computational, and parallel optimization techniques to increase the performance of various vehicle simulation programs. I supported engineering on a several projects including video capture and processing, data extraction and interpolation and increasing usability and efficiency of engineering tools. The engineer support utilized my knowledge of system administration, databases, data compression, storage and serving as an interface between engineering and IT staff.

## Clemson University

iTiger Developer, Graduate Research/Lab Assistant, Junior System Administrator

Aug. 2006 – Nov. 2010

Clemson, SC

I helped design and develop a data-driven, real-time content delivery system for football statistics and video replays during Clemson football games. In this capacity, I also was one of the two operators of the system of Clemson home football games. In my time with the project, we streamlined the content production workflow to 5x previous volume, and made the system interact directly with the scoreboard -- a notable improvement in the system.

I installed, configured, and maintained diverse hardware and software for Solaris (5.9, 5.10), GNU/Linux (CentOS 4.x, Fedora Core 4/5), and Mac OS X (10.4) client and server machines. My responsibilities further included staffing the help desk; applying security policies; and general network troubleshooting.

## QUALIFICATIONS

- OS: Solaris, Linux (RHEL, CentOS, SLE[S/D], Fedora, Ubuntu, Gentoo), Mac OS X, Windows
- Programming: C, C++, Perl, Bourne shell, PHP, Java
- Daemons/Services: Apache HTTP, NIS, NFS, DNS, DHCP, TFTP, PXE, CUPS, Samba/CIFS, WebSphere
- Authoring: LaTeX, (X)HTML, CSS
- Applications/Environments: Vi/Vim, Cygwin, Eclipse 3.x, Visual Studio
- Virtualization: KVM, VMWare (ESX, Virtual Infrastructure, Server, Workstation), Xen

## EDUCATION

Clemson University

December 2010

**Ph.D. in Computer Science**

Thesis Title: A Framework for Virtual Device Driver Development and Virtual Device-Based Performance Modeling

Thesis Advisor: Dr. Robert M. Geist, III

High Point University

May 2006

**B.S. in Computer Science and Mathematics**

All University Honors, Highest Departmental Honors, Summa Cum Laude

Overall GPA: 3.9/4.0, Computer Science GPA: 4.0/4.0, Mathematics GPA: 3.9/4.0

## PUBLICATIONS

- Geist, Robert, Jones, Zachary H., and Westall, James. Predicting (Disk Scheduling) Performance with Virtual Machines. To appear in *Proceeding of Performance Evaluation of Computer and Communication Systems: Milestones and Future Challenges* (PERFORM 2010), October 2010.
- Geist, Robert, Jones, Zachary H., and Westall, James. Virtualizing High-Performance Graphics Cards for Driver Design and Development. In *Proceedings of the 19<sup>th</sup> Annual Int. Conf. of the IBM Centers for Advanced Studies on Collaborative Research* (CASCON), pp. 261-269, November 2009.
- Geist, Robert, Jones, Zachary H., and Westall, James. Virtualization of an Advanced Course in Operating Systems (Extended Abstract). In *Proceedings of the 3<sup>rd</sup> International Conference on the Virtual Computing Initiative*, pages 61-64, October 2009
- Dean, Brian C. and Zachary H. Rank-Sensitive Priority Queues. In *Proceedings of the Algorithms and Data Structures Symposium* (WADS), pp. 181-192, August 2009
- Geist, Robert, Jones, Zachary H., and Steele, Jay. Parallel Processing Flow Models on Desktop Hardware. In *Proceedings of the 46<sup>th</sup> ACM Southeast Conference (ACMSE)*, pp. 417-422, March 2008.
- Dean, Brian C. and Jones, Zachary H. Exploring the Duality between Skip Lists and Binary Search Trees. In *Proceedings of the 45<sup>th</sup> ACM Southeast Conference (ACMSE)*, pp. 395-399, March 2007.

## AWARDS

Outstanding Graduate Student Researcher, School of Computing, Clemson University

February 2010

IBM Ph.D. Fellowship

Aug. 2009 – May 2010

Outstanding Ph.D. Student, School of Computing, Clemson University

February 2009

Graduate Recruitment Fellowship, Clemson University

Aug. 2006 – May 2007

\*References available upon request