

Danhua Guo Ph.D.

CONTACT

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EDUCATION

University of California, Riverside Sept. 2005 – June 2010
Doctor of Philosophy, Computer Science and Engineering Department
Advisor: Professor and Chair, Laxmi N. Bhuyan
Research topic: Application-Oriented Networking
GPA 3.86/4.00: (Description of course projects available on webpage)

Beijing University of Technology (BJUT) Sept. 2001 - July 2005
Bachelor of Engineering, Advanced Class, College of Computer Science and Technology
GPA 3.72/4.00 88.76/100 Rank: 3rd in class of 420

PROFESSIONAL EXPERIENCE

Microsoft Corp.

Mountain View, CA, USA

Software Development Engineer

Sept. 2011 - Present

- Working on signal gathering and ads selection in the Delivery Engine team at AdCenter.
- Owner of Publisher Store. Handles Ad call validation and keyword exclusion and publisher data. Front door to keyword server.
- Design and document P0 tests.

Cisco Systems Inc.

San Jose, CA, USA

Software Engineer. System Engineering (SAVBU)

July 2010 – Sept. 2011

- Performance tuning for Cisco 10G enic driver and userspace NIC driver
 - Enabled VTune and Oprofile to pinpoint the performance hotspots on different x86-based server platforms (Intel chipset and memory module combinations).
 - Resolved a synchronization bottleneck for enic and improved throughput by 5%.
- Userspace NIC driver
 - Developed connection teardown and concurrent connection features for RedHat MRG AMQP package.
 - Developed a command line tool to query device info similar to “ethtool”.
 - Measured and fine-tuned throughput and latency performance using different system buffer and cache parameters.
- Cisco enic support for VMware ESX
 - Provided driver support for VMware ESX network kernel development, i.e. control plane operations for Distributed Virtual Switch (DVS) and data plane operations for vSwitch.

Cisco Systems Inc.

San Jose, CA, USA

College Intern

June 2008 - Sept. 2008

- Developed an online scalable multithreaded L7-filter for multi-core based systems.
 - Results won the 1st-place Award in the 2008 Cisco Intern Project Competition.
- Supervisor: Jason Ding*

International Affairs Office of Illinois Institute of Technology

Beijing, China

Web Administrator

July 2004 - Aug. 2005

- Network maintenance of the computer system in the office.
- Promotion of IIT in China, including communication with local government, translation and drafting of introduction paperwork.

Supervisors: Tim Zhang, Vivian Jin

TALKS

- **Cisco Systems Inc.**

San Jose, CA, USA

Sept. 2008

“*Nerdlunch: A Scalable Multithreaded L7-filter Design for Native and Virtualized Multi-Core based Systems.*”

TECHNICAL SKILLS

Languages

- English (fluent), German (capable of reading), Mandarin Chinese (native).

Computer Languages

- *Software:* C/C++/C#, HTML/XML, Matlab/Maple, LaTeX.
- *Script:* Kernel Shell, Python, MAYA MTL
- *Hardware:* MicroC/MicroCode, Verilog/VHDL, Assembly

Platforms

- *Operating System:* Windows, Unix/Linux, Solaris
- *Networking and simulators:* TCP/IP Stack, Intel IXA Workbench, SGI RASC, SimpleScalar, NePSim, Bochs, M5, Simics, VTune, Oprofile
- *Virtualization:* Xen, VMWare ESX/ESXi

RESEARCH INTERESTS

- Server architecture for fast network I/O processing, with focus on deep packet inspection
- OS scheduling for multi-core data centers
- Virtualization for data center/server consolidation; cloud computing
- High performance computing; parallel processing

ACADEMIC AND RESEARCH EXPERIENCE

University of California, Riverside

Research Assistant

April 2006 - Present

- “*Application-Oriented Networking*”
 - Designed and implemented several scheduling algorithms for network applications on multicore web servers to accelerate network I/O processing.

- Proposed a scalable multithreaded L7-filter software and corresponding optimized system schedulers for both Linux and Solaris. Results showed a 51% improvement on average in system throughput compared to naive multithreading.
- Explored instruction level parallelism in the Linux TCP/IP stack.
- Publication: [ANCS '08 L7][ANCS '09 Solaris][ANCS '10][INFOCOM '11][TON]
- *Performance Characterization of Virtualization*
 - Studied extensively on para-virtualization, particularly network overhead.
 - Proposed several multi-core schedulers in the virtual machine monitor to improve virtualized network performance by taking advantage of multi-core architecture.
 - Publication: [ANCS '08 Xen][IISWC '09 Xen]
- *CPU and Network Interface Controller (NIC) integration design*
 - Experimented core scheduling techniques using Dell Power Edge 2900 (Intel Xeon X5355 * 8) with dual-port 10GbE NIC.
 - Collaborated to develop a full system cycle accurate simulator based on Simics.
 - Publication: [ANCS '09 EINIC]
- *Hardware solution for Deep Packet Inspection (DPI) on SGI workstation.*
 - Rewrote Linux L7-filter and generated its VHDL counterpart to offload to SGI RASC FPGAs.
 - Evaluated results based on FPGA performance and speed up in comparison to general purpose processors.
- Intel IXA Network Processor.
 - Port-mapped Mibench in ASCII C to MicroC, and evaluated the embedded application performance on IXA Workbench.

Guest Lecturer and Teaching Assistant

Sept. 2005 - Aug. 2007

- CS 213 Parallel Processing (Graduate level compulsory course)
 - Lectured on multiprogramming, memory management, NUMA architecture, multicore scheduling.
 - Designed, consulted and tutored for class projects using FPGA/CPU/GPU platforms.
- CS 12 (Head TA) Data structures in C++
 - Jobs included lecture and supervision of lab, making up finals, grading and maintenance of course website.
 - Student evaluation score: 6.9/7.0

Beijing University of Technology (BJUT)

Research Assistant

Dec. 2004 – July 2005

- Led the “Automatic Generation of Computer Animation” project.
 - Designed schema for XML storage.
 - Implemented knowledge-based searching algorithm in Java.
 - Presented results with MAYA animation.

PUBLICATIONS

- [TON] **Danhua Guo**, Laxmi Bhuyan and Bin Liu, “An Efficient Parallelized L7-Filter Design for Multicore Servers”, to appear in IEEE/ACM Transaction on Networking

- [ANCS '11] Jilong Kuang, Laxmi Bhuyan, Haiyong Xie and **Danhua Guo**, "E-AHRW: An Energy-efficient Adaptive Hash Scheduler for Stream Processing on Multi-core Servers", *ACM/IEEE Symposium on Architectures for Networking and Communications Systems (ANCS)*, Brooklyn, NY, 2011
- [INFOCOM '11] **Danhua Guo**, Laxmi Bhuyan, "A QoS Aware Multicore Hash Scheduler for Network Applications", *IEEE International Conference on Computer Communications (INFOCOM)*, Shanghai, China, 2011
- [ANCS '10] Jilong Kuang, **Danhua Guo**, Laxmi Bhuyan, "Power Optimization for Multimedia Transcoding on Multicore Servers", *ACM/IEEE Symposium on Architectures for Networking and Communications Systems (ANCS)*, La Jolla, CA, 2010
- [ANCS '09 Solaris] **Danhua Guo**, Guangdeng Liao, Laxmi Bhuyan, Bin Liu, "An Adaptive Hash-based Multilayer Scheduler for L7-filter on a Highly Threaded Hierarchical Multi-Core Server", *Symposium on Architectures for Networking and Communications Systems (ANCS)* 2009.
- [ANCS '09 EINIC] Guangdeng Liao, Laxmi Bhuyan, **Danhua Guo**, Steve King, "EINIC: an Architecture for High Bandwidth Network I/O on Multi-Core Processors", *Symposium on Architectures for Networking and Communications Systems (ANCS)* 2009.
- [IISWC '09 Xen] **Danhua Guo**, Guangdeng Liao, Laxmi Bhuyan, "Performance Characterization and Cache-Aware Core Scheduling in a Virtualized Multi-Core Server under 10GbE", *IEEE International Symposium on Workload Characterization (IISWC)* 2009.
- [ANCS '08 L7] **Danhua Guo**, Guangdeng Liao, Laxmi Bhuyan, Bin Liu, Jason Ding, "A Scalable Multithreaded L7-filter Design for Multi-Core Server", *Symposium on Architectures for Networking and Communications Systems (ANCS)* 2008.
- [ANCS '08 Xen] Guangdeng Liao, **Danhua Guo**, Laxmi Bhuyan, Steven King, "Software Techniques to Improve Virtualized I/O Performance on Multi-Core Systems", *Symposium on Architectures for Networking and Communications Systems (ANCS)* 2008.

HONORS

- IISWC Student Travel Grant Recipient (2009)
- ANCS Student Travel Grant Recipient (2008, 2009)
- 1st-place Award, Cisco CDO Intern Project Competition (2008)
- Graduate Division Fellowship, UC Riverside (2005 - 2007)
- "SORUN Scholarship" offered by SORUN Enterprise, Japan (Top 0.2% in BJUT) (2002 - 2004)
- First Prize in National English Contest for College Students (2002 - 2004)
- Senior member and consultant in university debate team, BJUT (2003)