

HYOGI SIM

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Dept. of Computer Science, Virginia Tech
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Objective: To obtain a research and development position that will both utilize and enrich my current skills

RESEARCH INTERESTS

- File and Storage Systems, Distributed Systems, Operating Systems, Database Management Systems
- Non-Volatile Memory, Flash Memory, High Performance Computing, Parallel Processing

EDUCATION

Ph.D., Computer Science, Virginia Tech, VA — *present*

- Advisor: Dr. Ali R. Butt

M.S., Computer Science, Virginia Tech, VA — *Dec. 2014*

- Advisor: Dr. Ali R. Butt
- Thesis: AnalyzeThis: An Analysis Workflow-Aware Storage System

M.S., Electronics and Computer Engineering, Hanyang Univ., S. Korea — *Feb. 2008*

- Advisor: Dr. Jaehyuk Cha, Dr. Sooyong Kang
- Thesis: A Study of Performance Impact of Merging Storage Layers on Flash-Based DBMS

B.S., Urban Planning, Hanyang Univ., S. Korea — *Feb. 2005*

RESEARCH EXPERIENCE

Deploying SSDs in High Performance Computing Hierarchy — *2011-present, Virginia Tech*

- Developed an active storage target framework based on SCSI T10 OSD-2 specification.
- Enhanced OSD initiator driver and exofs in Linux to support the active processing.
- Designed and developed a FUSE file system for the active OSD devices.
- Developed a workflow scheduler within FUSE to orchestrate scientific workflow tasks across active OSD devices.
- Developed provenance management via SQLite within the file system.
(Linux Kernel, SCSI T10 OSD-2 Protocol, FUSE, SQLite)

Managing Multimedia Data for Content Servers with Hybrid Storage — *2007-2009, Database Lab., Hanyang University*

- Developed content server log analyzer to analyze content popularity.
- Developed a prototype Linux file system for storage class memory device.
(Linux Kernel, Windows Media Server)

Design of a NAND Flash Memory-Based File System Supporting Transaction and Record Structure — *2006-2008, Database Lab., Hanyang University*

- Developed a framework to identify FTL mapping schemes of NAND Flash memory storage devices.
- Developed a DBMS which directly manages raw NAND Flash memory.
(Linux, Wisconsin Storage System, ARM-based embedded board)

Construction of a Protein Function Database — *2006-2008, Database Lab., Hanyang University*

- Developed a GUI environment which verifies protein graphs extracted from academic documents.
(Windows, SQLServer, Delphi)

WORK EXPERIENCE

Oak Ridge National Laboratory — *Postmasters, present*

- Designing and developing a searchable distributed file system.
(GlusterFS, Linux)
- Designing and developing a distributed file system with active processing and provenance management.
(GlusterFS, Linux)

Oak Ridge National Laboratory — *Research Intern, Jan-Aug 2013*

- Designed and developed a node local SSD-based framework for processing near storage in a HPC environment.
(Linux Kernel, SCSI T10 OSD-2 Protocol, FUSE, SQLite)

Pitapat Mobile, S. Korea — *Jan-June 2011*

- Developed a social marketing web application and a social quiz game running on Facebook.

(C#, Javascript, JQuery, HTML, PHP, SQL Server, MySQL, Amazon EC2)

Dept. of English Education, Hanyang University — Feb 2010, Aug 2009

- Developed an online-survey web application.

(Linux, PHP, MySQL, Apache)

Metabuild co., S. Korea — Dec 2008

- Developed a lane recognition system module for self-driving vehicles.
(Linux, C, ARM-based embedded board)

PUBLICATIONS

- **Hyogi Sim**, Youngjae Kim, Sudharshan S. Vazhkudai, Devesh Tiwari, Ali Anwar, Ali R. Butt, Lavanya Ramakrishnan, *AnalyzeThis: An Analysis Workflow-Aware Storage System*, Proceedings of the 2015 ACM/IEEE International Conference for High Performance Computing, Networking, Storage and Analysis (SC'15), Austin, TX
- **Hyogi Sim**, Youngjae Kim, Sudharshan S. Vazhkudai, Devesh Tiwari, Ali Anwar, Ali R. Butt, Lavanya Ramakrishnan, *AnalyzeThis: An Analysis Workflow-Aware Storage System*, Poster in the 2015 USENIX Annual Technical Conference (ATC), Santa Clara, CA, July 2015
- **Hyogi Sim**, Hoyoung Jung, Sungmin Park, Sooyong Kang, Jaehyuk Cha, *Identifying the FTL Mapping Scheme for USB Flash Devices*, The 4th International Conference on Convergence Technology and Information Convergence, CTIC 2009, Oct. 12
- Sooyong Kang, Sungmin Park, Hoyoung Jung, **Hyogi Sim**, Jaehyuk Cha, *Performance Tradeoffs in Using NVRAM Write Buffer for Flash Memory-based Storage Devices*, IEEE Transactions on Computers, Vol. 58, Issue 6 (Jun. 2009) Pages 744-758
- Hoyoung Jung, **Hyogi Sim**, Sungmin Park, Sooyong Kang, Jaehyuk Cha, *LRU-WSR: Integration of LRU and Writes Sequence Reordering for Flash Memory*, IEEE Transactions on Consumer Electronics, Volume 54, Issue 3 (Aug. 2008)
- Sungmin Park, Hoyoung Jung, **Hyogi Sim**, Sooyong Kang, Jaehyuk Cha, *Using Non-Volatile RAM as a Write Buffer for NAND Flash Memory-based Storage Devices*, 2008 IEEE International Symposium on Modeling, Analysis & Simulation of Computer & Telecommunication Systems, MASCOTS 2008, Sept 8-10, Baltimore, MD
- Sungmin Park, Hoyoung Jung, **Hyogi Sim**, Sooyong Kang, Jaehyuk Cha, *Write Buffer-aware Address Mapping for NAND Flash Memory Devices*, 2008 IEEE International Symposium on Modeling, Analysis & Simulation of Computer & Telecommunication Systems, MASCOTS 2008, Sept 8-10, Baltimore, MD
- Hoyoung Jung, Kyunghoon Yoon, **Hyogi Sim**, Sungmin Park, Sooyong Kang, Jaehyuk Cha, *LIRS-WSR: Integration of LIRS and Write Sequence Reordering for Flash Memory*, The 2007 International Conference on Computational Science and Its Applications, ICCSA LNCS 2007, Aug. 29

TEACHING EXPERIENCE

Computer Organization II — Spring 2012, Fall 2011 (Teaching assistant)

- Graduate Teaching Assistant, Dept. of Computer Science, Virginia Tech

File Structure — Spring 2009, Fall 2007 (Leading lab sessions)

- Graduate Teaching Assistant, Division of Computer Science and Engineering, Hanyang University

Data Structures — Spring 2007 (Leading lab sessions)

- Graduate Teaching Assistant, Division of Computer Science and Engineering, Hanyang University

Object Oriented Programming — Spring 2005 (Leading lab sessions)

- Graduate Teaching Assistant, Dept. of Computer Science Education, Hanyang University

GRADUATE-LEVEL COURSES

Virginia Tech: Statistics in Research, Multiprocessor Programming, Research Method in CS, Advanced Parallel Computation, Advanced Topics in System and Network Security, Operating Systems

Hanyang Univ.: Advanced Operating System, Computer Algorithms, Database System Implementation, Real-Time Systems, Cryptography, Database Tuning

AWARDS & SCHOLARSHIPS

Virginia Tech: Graduate Research Assistantship — Fall 2011, 2012, 2013, Spring 2012, 2014

Hanyang Univ.: BK21 Scholarship — 2009, Academic Record Scholarship — 2005

TECHNICAL SKILLS

Skillful in Linux system/kernel programming and web programming.

- **File & Storage:** Linux VFS, Device Mapper, FUSE, SCSI, iSCSI, SRP, OSD, exoFS, GlusterFS
- **SSD:** NAND flash memory, Storage Class Memory, Flash Translation Layer (Address Mapping, GC, Wear-leveling)
- **Languages:** C (*proficient*), C++, Python, BASH, PHP, JAVA, C#, Javascript, Latex
- **Databases:** PostgreSQL, MySQL, MS SQLServer, IBM DB2, SQLite
- **Tools:** gcc, gdb, vim, Glade, Eclipse, Visual Studio, gnuplot