# 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

**M.S., Computer Science, Virginia Tech, VA** *— Dec 2014 (expected)*
- 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*
- 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** *— 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*, The 13th USENIX Conference on File and Storage Technologies (FAST '15) — *under review*

- **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 EXPERIENCES

**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

- File & Storage: Linux VFS, Device Mapper, FUSE, SCSI, iSCSI, SRP, OSD, exoFS
- NVRAM: FTL
- Linux system/kernel programming, Web programming
- 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