Gunjae Koo

CONTACT
INFORMATION

Address:
145 Anam-ro, Woojung Hall of Informatics 403
Seongbuk-gu, Seoul 02841, South Korea

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Homepage: http://gunjaekoo.com
Lab: http://csarch.korea.ac.kr

EDUCATION

University of Southern California, Los Angeles, CA

Ph.D., Electrical Engineering, Aug 2018
- Thesis: *Architectural Innovations for Mitigating Data Movement Cost on Graphics Processing units and Storage Systems*
- Adviser: Professor Murali Annavaram
- Area of Study: computer architecture, parallel processor architecture, storage & memory systems, in-storage data analytics, embedded systems, high-performance computing

Seoul National University, Seoul, South Korea

M.S., Electrical Engineering and Computer Science, Feb 2003
- Thesis: *An Equalizer and Viterbi Decoder Design for 1000BASE-T Gigabit Ethernet*
- Adviser: Professor Deog-Kyoon Jeong
- Area of Study: digital system design, VLSI, model-based design, signal processing, communication theory

B.S., Electrical Engineering, Feb 2001
- Thesis: *2.4GHz Low Noise Amplifier Design in a 0.25 μm CMOS Technology*
- Electrical specialization (emphasis on digital CMOS circuits design, digital systems design, computer systems and signal processing)

PROFESSIONAL
EXPERIENCE

Korea University, Seoul, South Korea

Associate Professor (Tenure Track)   **Mar 2020 to present**
- Area of Research: computer architecture, memory & storage systems, accelerators, secure architecture

Hongik University, Seoul, South Korea

Assistant Professor (Tenure Track)   **Sep 2018 to Feb 2020**
- Area of Research: computer architecture, memory & storage systems, FPGA, Accelerator, embedded systems

University of Southern California, Los Angeles, CA

Graduate Research Assistant   **Aug 2012 to Aug 2018**
- Advisor: Professor Murali Annavaram
- Area of Research: computer architecture, embedded systems, storage systems, near data processing, GPGPU, memory systems, energy efficient computing

Intel, Hillsboro, OR

Graduate Research Intern   **May 2016 to Dec 2016**
- Area of Research: memory controller for server architecture, next-generation memory technology

LG Electronics, Seoul, South Korea

Senior Research Engineer   **Apr 2008 to May 2011**
- SoC Group. System IC Laboratory / Digital TV Laboratory
- Area of Research: SoC design, FPGA platform design, digital system architecture & modeling, RTL design, verification & validation, image processing algorithm, image analysis

Senior Research Engineer   **Jul 2005 to Apr 2008**
- SoC Core Technology Group, Device & Material Laboratory
- Area of Research: SoC design, digital system architecture & modeling, RTL design, signal processing algorithm

Junior Research Engineer   **Mar 2003 to Jul 2005**
- Digital Media ASIC group, Digital Storage Research Laboratory
- Area of Research: signal processing algorithm, communication theory, RTL design & verification

Seoul National University, Seoul, South Korea

Graduate Research Assistant   **Mar 2001 to Feb 2003**
- Advisor: Professor Deog-Kyoon Jeong
- Area of Research: digital system design, verification, testing, signal processing algorithm, communication theory

Bitnuri, Seoul, South Korea

Researcher (co-founder)   **Mar 2000 to Dec 2000**
- Area of Research: digital system design

PUBLICATIONS   **Refereed Conferences**

[1] Jong Hyun Jeong, Myung Kuk Yoon, Yunho Oh, and Gunjae Koo. "Warped-MC: An Efficient Memory Controller Scheme for Massively Parallel Processors" *Proceedings of the 52nd International Conference on Parallel Processing (ICPP '23), Best Paper Award*, Aug 7–10, 2023.

[2] Yeong Seo Lee, Gunjae Koo, Young-Ho Gong, and Sung Woo Chung. "Stealth ECC: A Data-Width Aware Adaptive ECC Scheme for DRAM Error Resilience" *Design, Automation and Test in Europe Conference (DATE '22)*, Mar 14–23, 2022.

[3] Jongmin Lee, Junyeon Lee, Taeweon Suh, and Gunjae Koo. "CacheRewinder: Revoking Speculative Cache Updates Exploiting Write-Back Buffer" *Design, Automation and Test in Europe Conference (DATE '22)*, Mar 14–23, 2022.

[4] Jongmin Lee and Gunjae Koo. "Restore Buffer Overflow Attacks: Breaking Undo-Based Defense Schemes" *Proceedings of the 36th International Conference on Information Networking (ICOIN '22)*, Jan 12–15, 2022.

[5] Kiran Kumar Matam, Gunjae Koo, Haipeng Zha, Hung-Wei Tseng, and Murali Annavaram. "GraphSSD: Graph Semantics Aware SSD". *Proceedings of the 46th Annual International Symposium on Computer Architecture (ISCA '19)*, Jun 22–26, 2019.

[6] Yunho Oh, Gunjae Koo, Murali Annavaram, and Won Woo Ro. "Linebacker: Preserving Victim Cache Lines in Idle Register Files of GPUs". *Proceedings of the 46th Annual International Symposium on Computer Architecture (ISCA '19)*, Jun 22–26, 2019.

[7] Gunjae Koo, Hyeran Jeon, Zhenhong Liu, Nam Sung Kim, and Murali Annavaram. "CTA-Aware Prefetching and Scheduling for GPU". *Proceedings of the 32nd IEEE International Parallel and Distributed Processing Symposium (IPDPS '18)*, May 21–25, 2018.

[8] Gunjae Koo, Kiran Kumar Matam, Te I, Hema Venkata Krishna Giri Nara, Jing Li, Hung-Wei Tseng, Steven Swanson, and Murali Annavaram. "Summarizer: Trading Communication with Computing Near Storage". *Proceedings of the 50th Annual IEEE/ACM International Symposium on Microarchitecture (MICRO '17)*, Oct 14–18, 2017.

[9] Gunjae Koo, Yunho Oh, Won Woo Ro, and Murali Annavaram. "Access Pattern-Aware Cache Management for Improving Data Utilization in GPU". *Proceedings of the 44th Annual International Symposium on Computer Architecture (ISCA '17)*, Jun 24–28, 2017.

[10] Keunsoo Kim, Sangpil Lee, Myung Kuk Yoon, Gunjae Koo, Won Woo Ro, and Murali Annavaram. "Warped-Preexecution: A GPU Pre-execution Approach for Improving Latency Hiding". *Proceedings of the 22nd International Symposium on High Performance Computer Architecture (HPCA '16)*, Mar 12–16, 2016.

[11] Gunjae Koo, Hyeran Jeon, and Murali Annavaram. "Revealing Critical Loads and Hidden Data Locality in GPGPU Applications". *Proceedings of the 2015 IEEE International Symposium on Workload Characterization (IISWC '15)*, Oct 4–6, 2015.

[12] Sangpil Lee, Keunsoo Kim, Gunjae Koo, Hyeran Jeon, Won Woo Ro, and Murali Annavaram. "Warped-Compression: Enabling Power Efficient GPUs through Register Compression". *Proceedings of the 42nd Annual International Symposium on Computer Architecture (ISCA '15)*, Jun 13–17, 2015.

[13] Gunjae Koo, Kyoung Won Lim, and Seung Jong Choi. "Complementary Block-Based Motion Estimation for Frame Rate Up-Conversion". *The 2011 IEEE International Conference on Consumer Electronics (ICCE '11)*, Jan 9–12, 2011.

[14] Gunjae Koo, Woochul Jung, and Heesub Lee. "A Robust PRML Read Channel with Digital Timing Recovery for Multi-Format Optical Disc". *Proceedings of the 2006 IEEE International Symposium on Circuits and Systems (ISCAS '06)*, May 21–24, 2006.

Journals

[15] Jaebeom Jeon, Gunjae Koo, Myung Kuk Yoon, and Yunho Oh. "Adaptive Kernel Merge and Fusion for Multi-Tenant Inference in Embedded GPUs" *IEEE Embedded Systems Letters*, *Accepted (early access)*, 2024.

[16] Minkyu Song, Taeweon Suh, and Gunjae Koo. "Vizard: Passing Over Profiling-Based Detection by Manipulating Performance Counters". *IEEE Access*, Vol. 11, pp. 48099–48112, 2023.

[17] Gunjae Koo, Yunho Oh, Hung-Wei Tseng, Won Woo Ro, and Murali Annavaram. "FLIXR: Embedding Index into Flash Translation Layer in SSDs". *IEEE Transactions on Computers*, Vol. 72, No. 1, pp. 250–263. 2023.

[18] Inje Kim, Jonghyun Jeong, Yunho Oh, Myung Kuk Yoon, and Gunjae Koo. "Analyzing GCN Aggregation on GPU". *IEEE Access*, Vol. 10, pp. 113046–113060. 2022.

[19] Jongmin Lee, Seungho Jung, Taeweon Suh, Yunho Oh, Myung Kuk Yoon, and Gunjae Koo. "GhostLeg: Selective Memory Coalescing for Secure GPU Architecture". *IEEE Access*, Vol. 10, pp. 111449–111462. 2022.

[20] Minkyu Song, Junyeon Lee, Taeweon Suh, and Gunjae Koo. "RT-Sniper: A Low-Overhead Defense Mechanism Pinpointing Cache Side-Channel Attacks". *MDPI Electronics*, Vol. 10, No. 22. 2021.

[21] Won Jeon, Jun Hyun Park, Yoonsoo Kim, Gunjae Koo, and Won Woo Ro. "Hi-End: Hierarchical, Endurance-Aware STT-MRAM-Based Register File for Energy-Efficient GPUs". *IEEE Access*, Vol. 8, pp. 127768–127780. 2020.

[22] Sangpil Lee, Keunsoo Kim, Gunjae Koo, Hyeran Jeon, Murali Annavaram and Won Woo Ro. "Improving Energy Efficiency of GPUs through Data Compression and Compressed Execution". *IEEE Transactions on Computers*, Vol. 66, No. 5, pp. 834–847. 2017.

[23] Kyoung Won Lim, Hansoo Kim, Hyunchul Noh, Hyunchul Shin, Woochul Jung, Gunjae Koo and Ryuk Park. "Advanced Frame Rate Conversion without Halo and Judder Effect for 120Hz LCD Displays". *iMiD/IDMC/Asia Display*, Vol. 8 Book-II, pp. 1397–1400. 2008.

Workshops and Technical Reports

[24] Gunjae Koo, Kiran Kumar Matam, Te I, Hema Venkata Krishna Giri Nara, Jing Li, Hung-Wei Tseng, Steven Swanson, and Murali Annavaram. "Dynamic Near Data Processing Framework for SSDs". *The 9th Annual Non-Volatile Memories Workshop (NVMW '18)*, Mar 11–13, 2018.

[25] Hyeran Jeon, Gunjae Koo and Murali Annavaram. "CTA-aware Prefetching for GPGPU". *Computer Engineering Technical Report, Ming Hsieh Department of Electrical Engineering, University of Southern California*, Oct, 2014.

Refereed Conferences (Korea)

[26] Hyunwoo Moon and Gunjae Koo. "Performance Analysis of Embedding Cache Models for Optimizing Data Movement in Recommendation Systems". *Proceedings of the 2023 Korea Computer Congress (KCC '23)*, Jun 18–20, 2022.

[27] Boyoung Park and Gunjae Koo. "Performance Analysis of the Modern Genome Alignment Application". *Proceedings of the 2022 Korea Software Congress (KSC '22)*, Dec 20–23, 2022.

[28] Hunjong Lee and Gunjae Koo. "Performance Analysis of Graph Convolutional Networks on Accelerator Architectures". *Proceedings of the 2022 Korea Computer Congress (KCC '22)*, Jun 29–Jul 1, 2022.

[29] Inje Kim and Gunjae Koo. "Analyzing the Performance of GCN Inferences with respect to Sparsity of Graph Features". *Proceedings of the 2021 Korea Software Congress (KSC '21)*, Dec 20–22, 2021.

[30] Jonghyun Jeong, Yunho Oh, and Gunjae Koo. "Analyzing Data Cache Performance of Modern GPU Architecture". *Proceedings of the 2021 Korea Software Congress (KSC '21)*, Dec 20–22, 2021.

[31] Seungho Jung, Myung Kuk Yoon, and Gunjae Koo "Analyzing Characteristics of Memory Timing Side-Channels in GPU". *Proceedings of the 2021 Korea Software Congress (KSC '21)*, Dec 20–22, 2021.

[32] Inje Kim and Gunjae Koo. "Revealing Characteristics of GCN Inference Models Using a GPU Profiler". *Proceedings of the 2021 Korea Computer Congress (KCC '21)*, Jun 23–25, 2021.

[33] Hunjong Lee, Junhwan Yoo, and Gunjae Koo. "Audio Compression Accelerator Design for Improving the Response Time of AI Speakers". *Proceedings of the 2020 Summer Annual Conference of IEIE (IEIE '20)*, Aug 19–21, 2020

[34] Gunjae Koo, Woochul Jung, and Heesub Lee. "A PRML Read Channel for High Density Optical Disc". *Proceedings of the 13th Korean Conference on Semiconductors*. Feb 23–24, 2006.

Thesis

[35] Gunjae Koo. "Architectural Innovations for Mitigating Data Movement Cost on Graphics Processing units and Storage Systems". *Ph.D. Dissertation. Department of Electrical Engineering, University of Southern California*, Aug, 2018.

[36] Gunjae Koo. "An Equalizer and Viterbi Decoder Design for 1000BASE-T Gigabit Ethernet". *M.S. Thesis, Department of Electrical Engineering and Computer Science, Seoul National University*, Feb, 2003.

PATENTS

U.S. Patents

[1] Taeweon Suh, Gunjae Koo, Jongmin Lee, and Junyeon Lee. "Processor and Operation thereof to Revoke Cache Memory States Utilizing Write-Back Buffer". *U.S. Patent Pub. No. US 2023/0185724 A1*, Jun 15, 2023.

[2] Murali Annavaram, Gunjae Koo, Kiran Kumar Matam, and Hung-Wei Tseng. "Dynamic Near-Data Processing Control Mechanism Based on Computer Resource Availability on Solid-State Disk Platforms". *U.S. Patent Pub. No. US 2020/0310690 A1*, Oct 1, 2020.

[3] Gunjae Koo, Vivek Kozhikkottu, Shankar Ganesh Ramasubramanian, and Christopher B. Wilkerson. "Increasing Read Pending Queue Capacity to Increase Memory Bandwidth". *U.S. Patent Pub. No. US 2018/0188976 A1*, Jul 5, 2018.

[4] Gunjae Koo and Eun Pyo Lee. "Frequency Detection Method for Optical Disc Bit Reproduction Apparatus". *U.S. Patent No. US 7,433,289*, Oct 7, 2008.

Korean Patents

[5] Gunjae Koo, Jongmin Lee, Junyeon Lee, and Taeweon Suh. "Processor and Operation Thereof to Revoke Cache Memory States Utilizing Write-Back Buffer". *Korea Patent 10-2021-0179950*, Dec 15, 2021.

[6] Gunjae Koo. "Motion Estimation Method for Video Signal". *Korea Patent 10-2012-0106279*, Sep 26, 2012.

[7] Gunjae Koo. "Method of Frame Interpolation by Complementary Motion Estimation Algorithm". *Korea Patent 10-2011-0034241*, Apr 5, 2011.

[8] Gunjae Koo. "Method of Assigning Motion Vector of Occlusion Region". *Korea Patent 10-2011-0034242*, Apr 5, 2011.

[9] Gunjae Koo and Heesub Lee. "Liquid Crystal Display". *Korea Patent 10-2007-0077746*, Jul 27, 2007.

[10] Gunjae Koo and Hansoo Kim. "Method for Generating CAV Clock of Optical Disc". *Korea Patent 10-2007-0028754*, Mar 13, 2007.

[11] Gunjae Koo and Hyugjin Kwon. "Adaptive Boost Gain Controlled Limit Equalizer and Gain Calculation Method in Above Limit Equalizer". *Korea Patent 10-2006-0073662*, Oct 12, 2006.

[12] Gunjae Koo. "Optical Recording System for Detecting Frequency of Read Channel Using Wobble Signal and Playback Method Thereof". *Korea Patent 10-2006-0036534*, Jun 15, 2006.

[13] Gunjae Koo and Eun Pyo Lee. "Frequency Detecting Method in Optical Disk Bit Data Reproducing System". *Korea Patent 10-2005-0080866*, Jun 23, 2006.

[14] Gunjae Koo and Youngsoo Jang. "Apparatus of Detecting in Optical Disc and Method of Same". *Korea Patent 10-2005-0076072*, Apr 28, 2006.

TALKS

[1] Architectural Innovations for Big Data.
Korea University, Seoul, South Korea, Nov 2019.
Seoul National University, Seoul, South Korea, Nov 2019.

[2] Architectural Approaches for Accelerating Big Data.
IEIE SoC Conference, Daejeon, South Korea, May 2019.

[3] Diving into Data: Architectural Approaches to In-Storage Computing.
KIISE Computer System Society Conference, Pyeongchang, South Korea, Jan 2019.

[4] GPU Memory System Architecture for Big Data.
EDA Winter Workshop, Pyeongchang, South Korea, Jan 2019.

[5] CTA-Aware Prefetching and Scheduling.
IPDPS '18, Vancouver, British Columbia, Canada, May 2018.

[6] Dynamic Near Data Processing Framework for SSDs.
NVMW '18, La Jolla, California, Mar 2018.

[7] Architectural Challenges and Innovation for Accelerating Big Data Analytics.
Yonsei University, Seoul, South Korea, Sep 2018.
Postech, Pohang, South Korea, Jun 2018.
Texas A&M University, College Station, Texas, Apr 2018.
University of Central Florida, Orlando, Florida, Apr 2018.
Binghamton University, Binghamton, New York, Mar 2018.
University of California Santa Cruz, Santa Cruz, California, Mar 2018.

[8] Summarizer: Trading Communication with Computing Near Storage.
MICRO '17, Cambridge, Massachusetts, Oct 2017.

[9] Access Pattern-Aware Cache Management for Improving Data Utilization in GPU.
ISCA '17, Toronto, Ontario, Canada, Jun 2017.

[10] Revealing Critical Loads and Hidden Data Locality in GPGPU Applications.
IISWC '15, Atlanta, Georgia, Oct 2015.

[11] Complementary Block-Based Motion Estimation for Frame Rate Up-Conversion.
ICCE '11, Las Vegas, Nevada, Jan 2011.

FUNDING

[4] Regional Strategic Industry Convergence Security Core Talent Training Business.
Supported by Institute of Information and Communications Technology Planning and Evaluation (IITP) No. 2019-0-01343, May 2019 to Dec 2022.

[5] Research on CPU Vulnerability Detection and Validation.
Supported by Institute of Information and Communications Technology Planning and Evaluation (IITP) No. 2019-0-00533, Apr 2019 to Dec 2022.

[6] Research on Near Data Processing (NDP) Systems for Machine Learning Applications.
Supported by National Research Foundation of Korea (NRF) No. NRF-2018R1C1B5086594, Sep 2018 to Aug 2021.

TEACHING
EXPERIENCE

Korea University, Seoul, South Korea

Instructor

• CVO102: Computer Architecture	Fall 2023
• AAA649: GPU Architecture	Fall 2022
• COSE221: Digital Logic Design	Spring 2023
• COSE222: Computer Architecture	Spring 2020 to Fall 2023
• AAA751: Storage System Architecture	Fall 2021, Fall 2023
• SWS115: Secure Hardware Architecture	Spring 2021 to Spring 2023
• AAA634: Advanced Processor Architecture	Spring 2021
• AAA604: Parallel Processor Architecture	Fall 2020
• AAA514: Advanced Computer Architecture	Spring 2020, Spring 2022

Students Supervised

- Yujin Kim, Korea University (MS student, 2023–)
- Geonwoo Choi, Korea University (MS student, 2023–)
- Jiwon Shin, Korea University (MS student, 2023–)
- Dowon Kwon, Korea University (MS student, 2023–)
- Taewoon Kang, Korea University (MS student, 2023–)
- Yujin Lee, Korea University (MS student, 2023–)
- Yewon Hwang, Korea University (MS student, 2022–)
- Jaewon Seo, Korea University (MS student, 2022–)
- Dongjae Lee, Korea University (Undergraduate, 2021)
- Hyunwoo Moon, Korea University (Undergraduate, MS student, 2021–2023)
- Hunjong Lee, Korea University (MS student, 2021–2023)
- Myungjune Shin, Korea University (MS student, 2021)
- Boyoung Park, Korea University (MS student, 2021–2023)
- Jonghyun Jeong, Korea University (MS/PhD student, 2021–)
- Inje Kim, Korea University (MS student, 2021–2023)
- Jongmin Lee, Korea University (PhD student, 2020–2023)
- Seungho Jung, Korea University (MS student, 2020–2023)

Hongik University, Seoul, South Korea

Instructor

• 106827: Introduction to IoT Design	Fall 2019
• 106824: Storage System Architecture (IT System Design)	Spring 2019
• 106202: Digital Logic Design	Spring 2019
• 106601: Computer Architecture	Fall 2018
• 106610: Computer Communication Network	Fall 2018
• 106818: Embedded System Design	Fall 2018, Fall 2019

Students Supervised

- Junhwan Yoo, Hongik University (Undergraduate, 2019)
- Hunjong Lee, Hongik University (Undergraduate, 2019–2020)
- Inje Kim, Hongik University (Undergraduate, 2019–2020)
- Boyoung Park, Hongik University (Undergraduate, 2019–2020)
- Segon Oh, Hongik University (Undergraduate, 2019)
- Juhyeon Kim, Hongik University (Undergraduate, 2019–2020)
- Seungho Jung, Hongik University (Undergraduate, 2019–2020)

University of Southern California, Los Angeles, CA

Teaching Assistant

- EE 354: Introduction to Digital Circuits   Fall 2015, Spring 2016
- EE 560: Digital System Design - Tools and Techniques   Summer 2013
- EE 557: Computer Systems Architecture   Fall 2013, Spring 2014

Students Mentored

- Rohit Madan, University of Southern California (Direct Research, Fall 2017)
- Yung-Hung Chen, University of Southern California (Direct Research, Fall 2017)
- Qili Wang, University of Southern California (Intern, Summer 2017)
- Chirag Ahuja, University of Southern California (Direct Research, Spring 2015)
- Kevin Jia, University of Southern California (Intern, Summer 2014)
- Sangmin Kim, University of Southern California (Direct Research, Spring 2014)

Inter-university Semiconductor Research Center, Seoul, South Korea

Teaching Assistant

- VLSI Design Coursework   Jan 2002

Seoul National University, Seoul, South Korea

Teaching Assistant

- Electronics Circuits   Spring 2001
- Analog System Laboratory   Fall 2001

PROFESSIONAL
SERVICES

Conference/Workshop Organization
- The 27th IEEE International Symposium on High-Performance Computer Architecture (*HPCA '21*), Feb 2021.

Conference/Workshop Session Chair
- The 9th Annual Non-Volatile Memories Workshop (*NVMW '18*), Mar 2018.

Conference/Workshop Program Committee
- The 11th IEEE Non-Volatile Memory Systems and Applications Symposium (*NVMSA '22*), Aug 2022.
- The 14th Workshop on General Purpose Processing Using GPU (*GPGPU '22*), Apr 2022.
- The 10th IEEE Non-Volatile Memory Systems and Applications Symposium (*NVMSA '21*), Aug 2021.
- The 27th IEEE International Symposium on High-Performance Computer Architecture (*HPCA '21*), Feb 2021.
- The 9th IEEE Non-Volatile Memory Systems and Applications Symposium (*NVMSA '20*), Aug 2020.
- The 13th Workshop on General Purpose Processing Using GPU (*GPGPU '20*), Feb 2020.

Panelist
- USC Viterbi PhD Academic Career Mentoring Panel, May 2018.

Reviewer/External Reviewer
- ACM Transactions on Architecture and Code Optimization (*TACO*)
- IEEE Transactions on Knowledge and Data Engineering (*TKDE*)
- IEEE Transactions on Parallel and Distributed Systems (*TPDS*)
- IEEE Transactions on Emerging Topics in Computing (*TETC*)
- IEEE Transactions on Computers (*TC*)
- IEEE Internet of Things Journal (*IOT-J*)
- IEEE/ACM International Symposium on Computer Architecture (*ISCA*)
- IEEE/ACM International Symposium on Microarchitecture (*MICRO*)
- ACM SIGMETRICS International Conference on Measurement and Modeling of Computer Systems (*SIGMETRICS*)
- IEEE International Parallel and Distributed Processing Symposium (*IPDPS*)
- IEEE International Symposium on Workload Characterization (*IISWC*)
- IEEE International Conference on Computer Design (*ICCD*)
- IEEE International Symposium on Performance Analysis of Systems and Software (*ISPASS*)
- IEEE Computer Architecture Letters (*CAL*)
- ACM Transactions on Embedded Computing Systems (*TECS*)

AWARDS AND
HONORS

University of Southern California
- Viterbi School of Engineering Doctoral Fellowship, Aug 2011–Jul 2015

LG Electronics
- The 2009 LG Group Best R&D Products Award: 4th prize, Mar 2010
- The 2008 Outstanding Researcher Award in DTV Research Laboratory, Jan 2009

Seoul National University
- Honors Scholarship in the Department of Electrical Engineering, Mar 1999

HARDWARE AND
SOFTWARE SKILLS

Storage System Development Platforms
- Dragonfire board (Intelligent-SSD)
- OpenSSD

Computer Architecture Simulators
- Processor simulators: GPGPU-sim, DRAMSim, Ramulator, ZSim, Gem5, SimpleScalar, SESC, Multi2Sim.
- Power estimation: McPat, Wattch, CACTI.

SoC and VLSI Design
- Hardware description languages: Verilog, VHDL
- RTL simulation and verification tools: NCsim, Verdi, ModelSim
- RTL coverage and lint tools: ICCR, Spyglass
- Logic synthesis tool: Synopsys design compiler
- FPGA tools: Xilinx Vivado, Intel Quartus Prime, Chipscope
- ASIC emulation tool: ZeBu

Modeling and Analysis
- Analysis tool: Matlab
- Model-based design tool: Simulink

Programming
- Programming languages: C, C++, Python
- Script languages: bash shell, GNU make, Perl
- Version control tools: git, SVN, CVS

MEMBERSHIPS

ACM member
IEEE member

SID member
Samsung frontier membership

REFERENCES   *References are available upon request.*