

DONGWHEE KIM

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SUMMARY

I am a Ph.D. student at The University of Texas at Austin, specializing in computer architecture with a focus on improving the reliability of quantum computers and memory systems. My academic background includes research presented at leading conferences such as HPCA and SC. Prior to my Ph.D. studies, I worked as an HBM I/O Circuit Design Engineer at Samsung Electronics and earned both my B.S. and M.S. degrees from Sungkyunkwan University.

- **Research Interests:** Computer Architecture, Quantum Computing, Memory Systems, Reliability

EDUCATION

The University of Texas at Austin (UT Austin)

Texas, United States

Ph.D., Electrical and Computer Engineering

Aug. 2025 – Present

- Advisor: Prof. Poulami Das

Sungkyunkwan University (SKKU)

Suwon, Korea

M.S., Semiconductor and Display Engineering

Feb. 2022 – Feb. 2024

- Thesis: "Unity ECC: Unified Memory Protection Against Bit and Chip Errors" (Advisor: Prof. Jungrae Kim)
- Teaching Assistant, "Digital System Design" (Spring 2022) [SSE3016-41]

B.S., Semiconductor Systems Engineering

Mar. 2016 – Feb. 2022

- Teaching Assistant, "AI Basics & Uses" (Spring 2021) [GEDT020-I1]

EMPLOYMENT

Samsung Electronics Memory Division

Hwaseong, Korea

Circuit Design Engineer

Mar. 2024 – May 2025

- HBM I/O Circuit Design
- Analyzed HBM I/O Training Sequence and Eye Shmoo to handle I/O related issues such as Rx/Tx margin and Duty Cycle Adjuster (DCA) for stabilized memory systems.

Summer Intern

Jul. 2021 – Aug. 2021

- DRAM Rowhammer Prevention Algorithm
- Implemented refresh algorithms against various DRAM row access patterns while minimizing read disturbance and power consumption.

SKKU Scalable Architecture Lab

Suwon, Korea

Research Assistant, Dept. of Semiconductor and Display Engineering

Sep. 2020 – Dec. 2023

- Reliable Memory System and DRAM Microarchitecture
- Developed reliable and efficient memory systems through research on innovative Error Correcting Codes and DRAM Microarchitecture.

PUBLICATIONS

[1] T. Park, S. Gorgin, **D. Kim**, J. Shin, M. Sullivan, and J. Kim, "PoP-ECC: Robust and Flexible Error Correction against Multi-Bit Upsets in DNN Accelerators," *Design Automation Conference (DAC)*, IEEE, 2025.

[2] Y. Lim, **D. Kim**, and J. Kim, "SELCC: Enhancing MLC Reliability and Endurance with Single-cell Error Correction Codes," *Design, Automation & Test in Europe Conference & Exhibition (DATE)*, IEEE, 2024. **Best Paper Award**

[3] J. Lee, W. Jung, **D. Kim**, D. Kim, J. Lee, and J. Kim, "Agile-DRAM: Agile Trade-Offs in Memory Capacity, Latency, and Energy for Data Centers," *The 30th IEEE International Symposium on High-Performance Computer Architecture (HPCA)*, 2024.

[4] **D. Kim**, J. Lee, W. Jung, M. Sullivan, and J. Kim, "Unity ECC: Unified Memory Protection Against Bit and Chip Errors," *The ACM/IEEE International Conference for High Performance Computing, Networking, Storage and Analysis (SC)*, 2023.

Best Student Paper Finalist, Invited to SAIF 2023

- [5] W. Jung, **D. Kim**, and J. Kim, "Synergistic Integration: An Optimal Combination of On-Die and Rank-Level ECC for Enhanced Reliability," *The 20th International SoC Design Conference (ISOCC)*, IEEE, 2023.
- [6] Y. Lim, **D. Kim**, and J. Kim, "SCC: Efficient Error Correction Codes for MLC PCM," *The 20th International SoC Design Conference (ISOCC)*, IEEE, 2023.
- [7] K. Kwon, **D. Kim**, S. Park, and J. Kim, "EPA ECC: Error-Pattern-Aligned ECC for HBM2E," *International Technical Conference on Circuits/Systems, Computers, and Communications (ITC-CSCC)*, IEEE, 2023.
- [8] **D. Kim***, Y. Lim*, S. Han, and J. Kim, "DNN Retraining Method Reducing Accuracy Degradation in Packet-Lossy Environments," *Journal of Korean Institute of Information Scientists and Engineers (KIISE)*, Vol. 50, No. 3, 2023.
- (* equal contributions)
- [9] **D. Kim** and J. Kim, "YOCO: Unified and Efficient Memory Protection for High Bandwidth Memory," *The 19th International SoC Design Conference (ISOCC)*, IEEE, 2022.

AWARDS & HONORS

Awards

DATE 2024 Best Paper Award [Link]	Mar. 2024
SC 2023 Best Student Paper Nomination [Link]	Nov. 2023
Fall 2023 CICE Superior Research Award (Second Place) [Link]	Sep. 2023 - Feb. 2024

Invited Presentation

Samsung AI Forum (SAIF) – Presented a poster on outstanding research in Computer Engineering.	Nov. 2023
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Scholarships

Samsung Electronics Industry-Academia Scholarship (full tuition & stipend)	Mar. 2020 – Feb. 2024
Undergraduate Research Program TA Scholarship	Apr. 2023, Aug. 2023
Director's Recommendation Scholarship	Nov. 2021
Undergraduate Research Program Student Success Scholarship	May 2021
Merit-based Semiconductor Education Scholarship	Aug. 2019
Samsung Semiconductor Scholarship (full tuition, 8 semesters)	Mar. 2016 – Feb. 2022

PATENTS

- [1] J. Kim and **D. Kim**, "Method and Apparatus for Generating Code for Single Symbol Error Correction and Double Error Correction," KR Patent 10-2656075, 2024. [[Patent](#)]
- [2] J. Kim and **D. Kim**, "Code Generation Method, Error Correction Code Generation Apparatus, and Storage Medium Storing Instructions to Perform Code Generation Method," US Patent 18,506,336, 2023 (Pending).

EDUCATIONAL RESOURCE

ECC-ExerSim (Error-Correcting Code Exercise and Simulator) [GitHub]	Sep. 2023
<ul style="list-style-type: none"> Korea Copyright Commission, No. C-2023-043210 Study the fundamentals of Error Correcting Codes through practical experimentation and develop experimental methodologies to evaluate the reliability of memory systems based on these principles. 	

PROFICIENCY IN SKILLS

Languages: C/C++, Python, Verilog, System Verilog

Technologies: TensorFlow, PyTorch, LaTeX

Standards: DDR, HBM

Tools: Vivado, VCS (GitHub), Verdi

LEADERSHIP EXPERIENCE

Military Service

Honorary Discharge as a Sergeant, Auxiliary Police 112 Strike Force	Seoul, Korea Apr. 2017 – Dec. 2018
<ul style="list-style-type: none"> Received the Commendation from the Commissioner of the Seoul Metropolitan Police Agency. 	Oct. 2017