

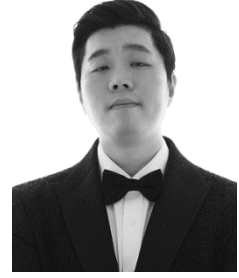
Hyun Kim

Associate Professor

Department of Electrical and Information Engineering

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Research Interests

- Digital system (SoC) design for Deep Neural Networks (AI accelerator design)
- Performance optimization for Deep Neural Networks
- Computer Architecture and Memory System Design for Deep Neural Networks
- Artificial Intelligence (AI) applications: Autonomous driving & Smart Factory
- High throughput and low power FPGA design for multimedia applications

Education

- *Ph.D.* in Electrical and Computer Engineering (2015.02), Seoul National University, Seoul, Korea
 - “H.264-based Low Power Heterogeneous Video Recording System”, Advisor: Hyuk-Jae Lee
- *M.S.* in Electrical and Computer Engineering (2011.02), Seoul National University, Seoul, Korea
 - “Power-Aware Design with Various Low-Power Algorithms for an H.264/AVC Encoder”, Advisor: Hyuk-Jae Lee
- *B.S.* in Electrical Engineering (2009.02), Seoul National University, Seoul, Korea

Work Experience

- *Associate Director* - Research and Industry-University Cooperation Foundation, Seoul National University of Science and Technology, Seoul, Republic of Korea (2022.12 ~ Current)
- *Associate Professor* - Department of Electrical and Information Engineering, Seoul National University of Science and Technology, Seoul, Republic of Korea (2022.10 ~ Current)
- *Assistant Professor* - Department of Electrical and Information Engineering, Seoul National University of Science and Technology, Seoul, Republic of Korea (2018.09 ~ 2022.09)
- *Assistant Professor* - BK21 Creative Research Engineer Development for IT, Seoul National University, Seoul, Republic of Korea (2016.03 ~ 2018.08)
- *Post Doctorial Fellow* - BK21 Creative Research Engineer Development for IT, Seoul National University, Seoul, Republic of Korea (2015.03 ~ 2016.02)

Teaching Experience

- System-on-a-Chip Design for Multimedia, (Spring 2022, Spring 2021, Spring 2019), Seoul National University of Science and Technology
 - Hardware Design for Deep Learning, (Fall 2022, Fall 2021, Fall 2020) Seoul National University of Science and Technology
 - Digital System Design, (Spring 2022, Spring 2021, Spring 2020, Spring 2019), Seoul National University of Science and Technology
 - Digital Logic Circuit, (Spring 2022, Spring 2021, Spring 2020), Seoul National University of Science and Technology
 - Computer Architecture, (Fall 2022, Fall 2021, Fall 2020, Fall 2018), Seoul National University of Science and Technology
 - Creative Engineering Design, (Fall 2022, Fall 2021, Fall 2020, Fall 2019, Fall 2018), Seoul National University of Science and Technology
 - Computational Thinking, (Fall 2019, Spring 2019), Seoul National University of Science and Technology
 - Programming language, Spring 2019, Seoul National University of Science and Technology
 - Introductory Laboratory for Electrical and Electronic Engineering (1), Spring 2022, Seoul National University of Science and Technology
 - Introductory Laboratory for Electrical and Electronic Engineering (2), (Fall 2022, Fall 2021, Fall 2020), Seoul National University of Science and Technology
 - Digital System Design and Experiments, (Fall 2017, Fall 2016), Seoul National University
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Professional Activities

- Senior Member, IEEE
- Member, IEEE CASS
- Executive Director, IEIE
- Cooperative Member, IEIE Semiconductor Society
- Associate Editor, IEIE Transactions on Smart Processing and Computing
- Topic Editor, Electronics
- Reviewer, IEEE Transactions on Circuits and Systems for Video Technology
- Reviewer, IEEE Transactions on Circuits and Systems I: Regular Papers
- Reviewer, IEEE Transactions on Circuits and Systems II: Express Briefs
- Reviewer, IEEE Transactions on Computers
- Reviewer, IEEE Transactions on Very Large Scale Integration (VLSI) Systems
- Reviewer, IEEE Transactions on Neural Networks and Learning Systems
- Reviewer, IEEE Transactions on Emerging Topics in Computing

- Reviewer, IEEE Transactions on Instrumentation & Measurement
- Reviewer, IEEE Signal Processing Letters
- Reviewer, IEEE Embedded Systems Letters
- Reviewer, IEEE Access
- Reviewer, Neurocomputing
- Reviewer, Conference on Neural Information Processing Systems (NeurIPS)
- Reviewer, IEEE International Conference on Machine Learning (ICML)
- Reviewer, International Conference on Learning Representations (ICLR)
- Reviewer, AAAI Conference on Artificial Intelligence (AAAI)
- Reviewer, IEEE International Conference on Artificial Intelligence Circuits and Systems (AICAS)
- Reviewer, IEEE International Symposium on Circuits and Systems (ISCAS)
- Reviewer, IEIE Journal of Semiconductor Technology and Science
- Organizing Committee Co-Chair, IEEE/IEIE The Sixth International Conference on Consumer Electronics Asia (ICCE-Asia) 2021
- Program Committee, 29th Asia and South Pacific Design Automation Conference (ASP-DAC 2024)
- Program Committee, International Conf. on Electronics, Information, and Communication 2023
- Technical Program Committee, The 30th Korean Conference on Semiconductors (KCS 2023)
- Technical Program Committee, The 19th International SoC Design Conference (ISOCC 2022)
- Program Committee, IEEE International Conference on Artificial Intelligence Circuits and Systems (AICAS) 2022
- Program Committee, The 4th Future and Challenges of Memory-Centric Computers Workshop
- Technical Program Committee, The 29th Korean Conference on Semiconductors (KCS 2022)
- Technical Program Committee, IEEE Seoul Section Student Paper Contest 2021
- Program Committee, IEIE SoC Conference 2021
- Program Committee, The 3rd Future and Challenges of Memory-Centric Computers Workshop
- Program Committee, International Conf. on Electronics, Information, and Communication 2020
- Program Committee, IEIE Summer Conf. 2018
- Verification Committee Member, Employment Examination for Seoul Civil Servant
- TF Committee Member, Intelligent Semiconductor Forum
- Session Chair, International Conf. on Electronics, Information, and Communication 2023
- Session Chair, Autumn Annual Conference of IEIE 2022
- Session Chair, IEIE Summer Conf. 2022

- Session Chair, IEEE International Symposium on Circuits and Systems 2022
- Session Chair, International Conf. on Electronics, Information, and Communication 2022
- Session Chair, Autumn Annual Conference of IEIE 2021
- Session Chair, IEIE SoC Conf. 2021
- Session Chair, IEIE Summer Conf. 2021
- Session Chair, The 3rd Future and Challenges of Memory-Centric Computers Workshop
- Session Chair, IEIE Summer Conf. 2020
- Session Chair, International Conf. on Electronics, Information, and Communication 2020
- Session Chair, IEIE Summer Conf. 2019
- Session Chair, IEIE Summer Conf. 2018
- Session Chair, International Conf. on Electronics, Information, and Communication 2017
- Session Chair, IEEE/IEIE International Conf. on Consumer Electronics 2016
- Session Chair, IEIE Summer Conf. 2016

Awards / Honors

- Best Student Paper Award with Grand Prize, IEEE Seoul Section Student Paper Contest, 2022
- Best Student Paper Award with Bronze Prize, IEEE Seoul Section Student Paper Contest, 2022
- Best Student Paper Award with Bronze Prize, IEEE Seoul Section Student Paper Contest, 2022
- Achievement Award, IEIE, 2021
- First Prize, Haedong Best Paper Award, 2021
- Best Paper Award Silver Prize, IEEE/IEIE ICCE-ASIA, 2021
- Education Field Excellence Award, Seoul National University of Science and Technology, 2020
- Bronze Award, 2020 AI Training Data [Dynamic Object Detection AI Data] Online Hackathon, 2020
- Bronze Award, 2020 AI Training Data [Road Driving Video AI Data] Online Contest, 2020
- Best Paper Award Silver Prize, ICEIC, 2020
- Best Paper Award, Autumn Annual Conference of IEIE, 2019
- Elected as an IEIE new researcher (2017)
- NAVER Best Paper Award, 2017 IEIE Summer Conference
- Excellence Award, 5th SoC Design Competition hosted by SNU SoC Design Technology Center

International Journal Publications

(* : Corresponding Author)

1. Hyocheon Lee, Seungyong Lee, Byeongki Song, Moonsoo Kim, Seokbo Shim, Hyun Kim*, and Hyuk-Jae Lee, "An In-Module Disturbance Barrier for Mitigating Write Disturbance in Phase-Change Memory," *IEEE Transactions on Computers*.
2. Nam Joon Kim and Hyun Kim*, "FP-AGL: Filter Pruning with Adaptive Gradient Learning for Accelerating Deep Convolutional Neural Networks," *IEEE Transactions on Multimedia*.
3. Jongho Lee and Hyun Kim*, "Discrete Cosine Transformed Images Are Easy To Recognize in Vision Transformer," *IEIE Transactions on Smart Processing & Computing*.
4. Jeong Jun Lee and Hyun Kim*, "Versatile Kernel Reactivation for Deep Convolutional Neural Networks," *IET Electronics Letters*, Vol. 58, No. 19, pp. 723-725, Sep. 2022.
5. Jiwoong Choi, Dayoung Chun, Hyuk-Jae Lee, and Hyun Kim*, "Efficient Object Detection Acceleration Methods for Autonomous-Driving Embedded Platforms," *IEIE Transactions on Smart Processing & Computing*, Vol. 11, No. 4, pp. 255-261, Aug. 2022.
6. Hyocheon Lee, Hyuk-Jae Lee, and Hyun Kim*, "A Read Disturbance Tolerant Phase Change Memory System for CNN Inference Workloads," *Journal of Semiconductor Technology and Science*, Vol. 22, No. 4, pp. 216-223, Aug. 2022.
7. Hyun Kim*, "Review of Optimal Convolutional Neural Network Accelerator Platforms for Mobile Devices," *Journal of Computing Science and Engineering*, Vol. 16, No. 2, pp. 113-119, Jun. 2022.
8. Moonsoo Kim, Hyocheon Lee, Hyun Kim*, and Hyuk-Jae Lee, "WL-WD: Wear-Leveling Solution to Mitigate Write Disturbance Errors for Phase-Change Memory," *IEEE Access*, Vol. 10, pp. 11420-11431, Jan. 2022.
9. Jeong Jun Lee, Ji Hoon Jang, Jin Hong Lee, Dayoung Chun, and Hyun Kim*, "CNN-based Mask-Pose Fusion for Detecting Specific Persons on Heterogeneous Embedded Systems," *IEEE Access*, Vol. 9, pp. 120358-120366, Sep. 2021.
10. Jin Shin and Hyun Kim*, "RL-SPIHT: Reinforcement Learning based Adaptive Selection of Compression Ratio for 1-D SPIHT Algorithm," *IEEE Access*, Vol. 9, pp. 82485-82496, Jun. 2021.
11. Duy Thanh Nguyen, Hyun Kim*, and Hyuk-Jae Lee, "Layer-specific Optimization for Mixed Data Flow with Mixed Precision in FPGA Design for CNN-based Object Detectors," *IEEE Transactions on Circuits and Systems for Video Technology*, Vol. 31, No. 6, pp. 2450-2464, Jun. 2021.
12. Seungyong Lee, Hyocheon Lee, Hyuk-Jae Lee, and Hyun Kim*, "Evaluation of Various Workloads in Filebench Suitable for Phase-Change Memory," *IEIE Transactions on Smart Processing & Computing*, Vol. 10, No. 2, pp. 160-166, Apr. 2021.
13. Duy Thanh Nguyen, Hyun Kim*, and Hyuk-Jae Lee, "An Approximate DRAM Design with an Adjustable Refresh Scheme for Low-Power Deep Neural Networks," *Journal of Semiconductor Technology and Science*, Vol. 21, No. 2, pp. 134-142, Apr. 2021.
14. Quan-Dung Pham, Xuan Truong Nguyen, Khac-Thai Nguyen, Hyun Kim*, and Hyuk-Jae Lee, "MLS: An MAE-aware LiDAR sampling framework in On-road Environments using Spatio-Temporal information," *IEEE Sensors Journal*, Vol. 21, No. 7, pp. 9389-9401, Apr. 2021.
15. Moonsoo Kim, Juhan Lee, Hyun Kim*, and Hyuk-Jae Lee, "An Optimal On-Demand Scrubbing Solution for Read Disturbance Errors in Phase-Change Memory," *IEIE Transactions on Smart Processing & Computing*, Vol. 10, No. 1, pp. 55-60, Feb. 2021.
16. Sungrae Kim and Hyun Kim*, "Zero-Centered Fixed-Point Quantization with Iterative Retraining for Deep Convolutional Neural Network-Based Object Detectors," *IEEE Access*, vol. 9, pp. 20828-

20839, 2021.

17. Xuan Truong Nguyen, Hyun Kim, and Hyuk-Jae Lee*, "An Efficient Sampling Algorithm with K-NN Expanding Operator for Depth Data Acquisition in a LiDAR System," *IEEE Transactions on Circuits and Systems for Video Technology*, Vol. 30, No. 12, pp. 4700-4714, Dec. 2020.
18. Xuan Truong Nguyen, Tuan Nghia Nguyen, Hyuk-Jae Lee, and Hyun Kim*, "An Accurate Weight Binarization Scheme for CNN Object Detectors with Two Scaling Factors," *IEIE Transactions on Smart Processing & Computing*, Vol. 9, No. 6, pp. 413-419, Dec. 2020.
19. HYOKEUN LEE, Hyunmin Jung, Hyuk-Jae Lee, and Hyun Kim*, "Bit width Reduction of Write Counters for Wear Leveling in a Phase-Change Memory System," *IEIE Transactions on Smart Processing & Computing*, Vol. 9, No. 5, pp. 413-419, Oct. 2020.
20. Xuan Truong Nguyen, Hyun Kim*, and Hyuk-Jae Lee, "A Gradient-Aware Line Sampling Algorithm for LiDAR Scanners," *IEEE Sensors Journal*, Vol. 20, No. 16, pp. 9283-9292, Aug. 2020.
21. Duy Thanh Nguyen, Nguyen Huy Hung, Hyun Kim*, and Hyuk-Jae Lee, "An Approximate Memory Architecture for Energy Saving in Deep Learning Applications," *IEEE Transactions on Circuits and Systems I*, Vol. 67, No. 5, pp. 1588-1601, May 2020.
22. Jinwoo Park, HYOKEUN LEE, Boyeal Kim, Dong-Goo Kang, Seung Oh Jin, Hyun Kim*, and Hyuk-Jae Lee, "A Low-Cost and High-Throughput FPGA Implementation of the Retinex Algorithm for Real-time Video Enhancement," *IEEE Transactions on Very Large Scale Integration (VLSI) Systems*, Vol. 28, No. 1, pp. 101-114, Jan. 2020.
23. HYOKEUN LEE, Moonsoo Kim, Hyunchul Kim, Hyun Kim*, and Hyuk-Jae Lee, "Integration and Boost of Read-Modify-Write Module in Phase Change Memory System," *IEEE Transactions on Computers*, Vol. 68, No. 12, pp. 1772-1784, Dec. 2019.
24. Xuan Truong Nguyen, KHAC-THAI NGUYEN, Hyun Kim*, and Hyuk-Jae Lee, "ROI-based LiDAR Sampling Algorithm in On-road Environment for Autonomous Driving," *IEEE Access*, Vol. 7, No. 1, pp. 90243-90253, Dec. 2019.
25. Moonsoo Kim, Jungwoo Choi, Hyun Kim*, and Hyuk-Jae Lee, "An Effective DRAM Address Remapping for Mitigating Rowhammer Errors," *IEEE Transactions on Computers*, Vol. 68, No. 10, pp. 1428-1441, Oct. 2019.
26. Duy Thanh Nguyen, Tuan Nghia Nguyen, Hyun Kim*, and Hyuk-Jae Lee, "A High-Throughput and Power-Efficient FPGA Implementation of YOLO CNN for Object Detection," *IEEE Transactions on Very Large Scale Integration (VLSI) Systems*, Vol. 27, No. 8, pp. 1861-1873, Aug. 2019.
27. Jiwoong Choi, Boyeal Kim, Hyun Kim*, and Hyuk-Jae Lee, "A High-Throughput Hardware Accelerator for Lossless Compression of a DDR4 Command Trace," *IEEE Transactions on Very Large Scale Integration (VLSI) Systems*, Vol. 27, No. 1, pp. 92-102, Jan. 2019.
28. Hyun Kim, Albert No, and Hyuk-Jae Lee, "SPIHT Algorithm with Adaptive Selection of Compression Ratio Depending on DWT Coefficients," *IEEE Transactions on Multimedia*, Vol. 20, No. 12, pp. 3200-3211, Dec. 2018.
29. Hyun Kim, Hyuk-Jae Lee, and Ik-joon Chang, "Optimal Selection of SRAM Bit-Cell Size for Power Reduction in Video Compression," *IEEE Journal on Emerging and Selected Topics in Circuits and Systems*, Vol. 8, No. 3, pp. 431-443, Sep. 2018.
30. Konstantin Bick, Duy Thanh Nguyen, Hyuk-Jae Lee, and Hyun Kim*, "Fast and Accurate Memory

- Simulation by Integrating DRAMSim2 into McSimA+,” *MDPI Electronics*, Vol. 7, No. 8, 152, Aug. 2018.
31. Xuan Truong Nguyen, Hyun Kim*, and Hyuk-Jae Lee, “A Low-cost Hardware Design of a 1D SPIHT Algorithm for Video Display Systems,” *IEEE Transactions on Consumer Electronics*, Vol. 64, No. 1, pp. 44-52, Jan. 2018.
 32. Xuan Truong Nguyen, Dinh Van Luan, Hyun Kim*, and Hyuk-Jae Lee, “A High-Definition LIDAR System Based on Two-Mirror Deflection Scanners,” *IEEE Sensors Journal*, Vol. 18, No. 2, pp. 559-568, Jan. 2018.
 33. Hyun Kim and Hyuk-Jae Lee, “A Low-Power Surveillance Video Coding System with Early Background Subtraction and Adaptive Frame Memory Compression,” *IEEE Transactions on Consumer Electronics*, Vol. 63, No. 4, pp. 359-367, Nov. 2017.
 34. Hyun Kim, Chae Eun Rhee, and Hyuk-Jae Lee, “A Low-Power Video Recording System with Multiple Operation Modes for H.264 and Light-Weight Compression,” *IEEE Transactions on Multimedia*, Vol. 18, No. 4, pp. 603-613, Apr. 2016.
 35. Sunwoong Kim, Donghyeon Lee, Hyun Kim, Nguyen Xuan Truong, and Jin-Sung Kim, “An enhanced one-dimensional SPIHT algorithm and its implementation for TV systems,” *Displays*, Vol. 40, pp. 68-77, Dec. 2015.
 36. Hyun Kim, Chae Eun Rhee, and Hyuk-Jae Lee, “An Effective Combination of Power Scaling for H.264/AVC Compression,” *IEEE Transactions on Very Large Scale Integration (VLSI) Systems*, Vol. 23, No. 11, pp. 2685-2689, Nov. 2015.
- Submitted / In preparation
 - Dayoung Chun, Jiwoong Choi, Hyuk-Jae Lee, and Hyun Kim*, “CP-DNN: Computational Parallelization of Deep Neural Networks on Heterogeneous Embedded Systems for Autonomous Driving,” *IEEE Access*.
 - Jun-Tae Park, Su Bin Ki, and Hyun Kim, “Dedicated FPGA Implementation of Accelerated Gaussian YOLO,” *IEEE Transactions on Circuits and Systems II*.
 - Nam Joon Kim and Hyun Kim*, “Trunk Pruning: Highly Compatible and Versatile Channel Pruning Without Fine-Tuning,” *IEEE Transactions on Multimedia*.
 - Jeong Jun Lee and Hyun Kim*, “Multi-step Training Framework Using Sparsity Training for Efficient Utilization of Accumulated New Data,” *IEEE Transactions on Multimedia*.

International Conference Publications

1. Nam Joon Kim and Hyun Kim*, “RepSGD: Channel Pruning Using Reparameterization for Accelerating Convolutional Neural Networks,” *IEEE International Symposium on Circuits and Systems (ISCAS 2023)*, May 2023.
2. Seung Il Lee, Dayoung Chun, and Hyun Kim*, “UCR-SSL: Uncertainty-Based Consistency Regularization for Semi-Supervised Learning,” *2023 International Conference on Electronics, Information, and Communications (ICEIC 2023)*, Feb. 2023.
3. Nam Joon Kim and Hyun Kim*, “AGT: Channel Pruning Using Adaptive Gradient Training for Accelerating Convolutional Neural Networks,” *2023 International Conference on Electronics, Information, and Communications (ICEIC 2023)*, Feb. 2023.

4. Jin Shin and Hyun Kim*, "DWT+DWT: Deep Learning Domain Generalization Techniques Using Discrete Wavelet Transform With Deep Whitening Transform," *2023 International Conference on Electronics, Information, and Communications (ICEIC 2023)*, Feb. 2023.
5. Ji Hoon Jang, Hyeon Lee, and Hyun Kim*, "Characterizing Memory Access Patterns of Various Convolutional Neural Networks for Utilizing Processing-In-Memory," *2023 International Conference on Electronics, Information, and Communications (ICEIC 2023)*, Feb. 2023.
6. Hyeon Seok Hong and Hyun Kim*, "Feature Distribution-based Knowledge Distillation for Deep Neural Networks," *19th International SoC Design Conference (ISOCC 2022)*, Oct. 2022.
7. Ji Hoon Jang, Hyeon Lee, and Hyun Kim*, "Performance Analysis of Phase Change Memory System on Various CNN Inference Workloads," *19th International SoC Design Conference (ISOCC 2022)*, Oct. 2022.
8. Seung Il Lee and Hyun Kim*, "GaussianMask: Uncertainty-aware Instance Segmentation based on Gaussian Modeling," *26th International Conference on Pattern Recognition (ICPR 2022)*, Aug. 2022. (IF: 1, NRF BK21+)
9. Sungrae Kim and Hyun Kim*, "Power-Efficient Double-Cyclic Low-Precision Training for Convolutional Neural Networks," *4th IEEE International Conference on Artificial Intelligence Circuits and Systems (AICAS 2022)*, Jun. 2022.
10. Dahun Choi and Hyun Kim*, "Hardware-Friendly Logarithmic Quantization with Mixed-Precision for MobileNetV2," *4th IEEE International Conference on Artificial Intelligence Circuits and Systems (AICAS 2022)*, Jun. 2022.
11. Seungjin Lee and Hyun Kim*, "DC-MPQ: Distributional Clipping based Mixed-Precision Quantization for Convolutional Neural Networks," *4th IEEE International Conference on Artificial Intelligence Circuits and Systems (AICAS 2022)*, Jun. 2022.
12. Hyeon Lee, Hyungsuk Kim, Seokbo Shim, Seungyong Lee, Dosun Hong, Hyuk-Jae Lee, and Hyun Kim*, "PCMCsim: An Accurate Phase-Change Memory Controller Simulator and its Performance Analysis," *2022 IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS 2022)*, May 2022. (IF: 1, NRF BK21+)
13. Subin Ki and Hyun Kim*, "Activation Distribution-based Layer-wise Quantization for Convolutional Neural Networks," *2022 International Conference on Electronics, Information, and Communications (ICEIC 2022)*, Feb. 2022.
14. Jin Shin and Hyun Kim*, "Fine-tuned SPIHT Algorithm to Improve Compression Efficiency," *2022 International Conference on Electronics, Information, and Communications (ICEIC 2022)*, Feb. 2022.
15. Hyeon Gi Seong, Hyeon Lee, Hyun Kim*, and Hyuk-Jae Lee, "Analysis of Hardware Prefetchers Suitable for CNN Applications," *IEEE/IEIE The Sixth International Conference on Consumer Electronics Asia (ICCE-Asia) 2021*, Nov. 2021.
16. Joohan Yi, Hyun Kim*, and Hyuk-Jae Lee, "Estimation of On-demand Scrubbing Points in Phase-Change Memory without Read Counter," *IEEE/IEIE The Sixth International Conference on Consumer Electronics Asia (ICCE-Asia) 2021*, Nov. 2021.
17. Seungyong Lee, Sanghyun Lee, Minseok Seo, Chunmyung Park, Hyuk-Jae Lee, Woojae Shin, and Hyun Kim*, "A High-Performance Scheduling Algorithm for Mode Transition in PIM," *IEEE/IEIE The Sixth International Conference on Consumer Electronics Asia (ICCE-Asia) 2021*, Nov. 2021.

18. Sungrae Kim and Hyun Kim*, "Linear Domain-aware Log-scale Post-training Quantization," *IEEE/IEIE The Sixth International Conference on Consumer Electronics Asia (ICCE-Asia) 2021*, Nov. 2021.
19. Juntae Park and Hyun Kim*, "Analysis for Implementing Power-Efficient Convolutional Operators on FPGA Platforms," *IEEE/IEIE The Sixth International Conference on Consumer Electronics Asia (ICCE-Asia) 2021*, Nov. 2021.
20. Dahun Choi and Hyun Kim*, "Hardware-friendly Log-scale Quantization for CNNs with Activation Functions Containing Negative Values," *18th International SoC Design Conference (ISOCC 2021)*, Oct. 2021.
21. Jeong Jun Lee, Seung Il Lee, and Hyun Kim*, "Continual Learning for Instance Segmentation to Mitigate Catastrophic Forgetting," *18th International SoC Design Conference (ISOCC 2021)*, Oct. 2021.
22. Hyun Kim*, "Implementation of Optimal CNN Accelerators for Mobile Devices: Algorithm, Architecture, and Memory System Co-Design," *18th International SoC Design Conference (ISOCC 2021)*, Oct. 2021.
23. Jin Shin and Hyun Kim*, "Object Detector Friendly Frame Memory Compression Based on 1-D DWT and SPIHT," *The 36nd International Technical Conference on Circuits/Systems, Computers and Communications (ITC-CSCC 2021)*, Jun. 2021.
24. Seungjin Lee and Hyun Kim*, "Feature Map-Aware Activation Quantization for Low-bit Neural Networks," *The 36nd International Technical Conference on Circuits/Systems, Computers and Communications (ITC-CSCC 2021)*, Jun. 2021.
25. Seung-Hwan Bae, Hyuk-Jae Lee, and Hyun Kim*, "DC-AC: Deep Correlation-based Adaptive Compression of Feature Map Planes in Convolutional Neural Networks," *IEEE International Symposium on Circuits and Systems (ISCAS 2021)*, May 2021.
26. Seung-Hwan Bae, Hyuk-Jae Lee, and Hyun Kim*, "Cache Compression with Golomb-Rice Code and Quantization for Convolutional Neural Network," *IEEE International Symposium on Circuits and Systems (ISCAS 2021)*, May 2021.
27. Seungjin Lee and Hyun Kim, "MPQ-YOLACT: Mixed-Precision Quantization for Lightweight YOLACT," *IEEE/IEIE The Fifth International Conference on Consumer Electronics Asia (ICCE-Asia) 2020*, Nov. 2020.
28. Sungrae Kim and Hyun Kim*, "Mixture of Deterministic and Stochastic Quantization Schemes for Lightweight CNN," *17th International SoC Design Conference (ISOCC 2020)*, Oct. 2020.
29. Nam Joon Kim and Hyun Kim*, "Mask-Soft Filter Pruning for Lightweight CNN Inference," *17th International SoC Design Conference (ISOCC 2020)*, Oct. 2020.
30. Seung Il Lee and Hyun Kim*, "Instant and Accurate Instance Segmentation Equipped with Path Aggregation and Attention Gate," *17th International SoC Design Conference (ISOCC 2020)*, Oct. 2020.
31. Quan-Dung Pham, Xuan Truong Nguyen, Hyuk-Jae Lee, and Hyun Kim*, "An MAE-aware ROI Sampling Model for LiDAR," *17th International SoC Design Conference (ISOCC 2020)*, Oct. 2020.
32. Xuan Truong Nguyen, Hyuk-Jae Lee, and Hyun Kim*, "A LiDAR sampling algorithm for depth data acquisition in on-road environment for autonomous driving," *2020 International Conference on Electric-Vehicle, Smart Grid, and Information Technology (ICESI 2020)*, Sep. 2020

33. Jiwoong Choi, Dayoung Chun, Hyuk-Jae Lee, and Hyun Kim*, "Uncertainty-based Object Detector for Autonomous Driving Embedded Platforms," *2nd IEEE International Conference on Artificial Intelligence Circuits and Systems (AICAS 2020)*, Aug. 2020.
34. Boyeal Kim, SangHyun Lee, Hyun Kim, Duy-Thanh Nguyen, Minh-Son Le, Ik Joon Chang, Dohun Kwon, Jin Hyeok Yoo, Jun Won Choi, and Hyuk-Jae Lee*, "PCM: Precision-Controlled Memory System for Energy Efficient Deep Neural Network Training," *Design, Automation and Test in Europe Conference 2020 (DATE 2020)*, Apr. 2020. (IF: 2, NRF BK21+, Acceptance rate: 26%)
35. Duy Thanh Nguyen, Hyuk-Jae Lee, Hyun Kim*, and, Ik-Joon Chang, "An approximate DRAM with efficient refresh schemes for low power deep learning applications," *2020 International Conference on Electronics, Information, and Communications (ICEIC 2020)*.
36. Dayoung Chun, Jiwoong Choi, Hyuk-Jae Lee, and Hyun Kim*, "Memory Concurrency Optimization of One-Stage Object Detector for Embedded Systems," *2020 International Conference on Electronics, Information, and Communications (ICEIC 2020)*, Jan. 2020.
37. Xuan Truong Nguyen, Tuan Nghia Nguyen, Hyuk-Jae Lee, and Hyun Kim*, "An Accurate Weight Binarization Method for a CNN Object Detector Using Double Scaling Factors," *2020 International Conference on Electronics, Information, and Communications (ICEIC 2020)*, Jan. 2020.
38. Moonsoo Kim, Hyuk-Jae Lee, and Hyun Kim*, "An On-Demand Scrubbing Solution for Read Disturbance Error in Phase-Change Memory," *2020 International Conference on Electronics, Information, and Communications (ICEIC 2020)*, Jan. 2020.
39. Hookeun Lee, Hyunmin Jung, Hyuk-Jae Lee, and Hyun Kim*, "Bitwidth Reduction of Write Counters for Wear Leveling in a Phase-Change Memory System," *2020 International Conference on Electronics, Information, and Communications (ICEIC 2020)*, Jan. 2020.
40. Jiwoong Choi, Dayoung Chun, Hyuk-Jae Lee, and Hyun Kim*, "Uncertainty Modeling and Its Utilization for Accurate Object Detection in Autonomous Driving," *2020 International Conference on Electronics, Information, and Communications (ICEIC 2020)*, Jan. 2020.
41. Jiwoong Choi, Dayoung Chun, Hyun Kim*, and Hyuk-Jae Lee, "Gaussian YOLOv3: An Accurate and Fast Object Detector using Localization Uncertainty for Autonomous Driving," *International Conference on Computer Vision 2019 (ICCV 2019)*, Oct. 2019. (IF: 4, NRF BK21+, Acceptance rate: 25%)
42. Dayoung Chun, Jiwoong Choi, Hyun Kim*, and Hyuk-Jae Lee, "A Study for Selecting the Best One-Stage Detector for Autonomous Driving," *The 34th International Technical Conference on Circuits/Systems, Computers and Communications (ITC-CSCC 2019)*, Jun. 2019.
43. Tuan Nghia Nguyen, Xuan Truong Nguyen, Hyun Kim*, and Hyuk-Jae Lee, "A Lightweight YOLOv2 Object Detector Using a Dilated Convolution," *The 34th International Technical Conference on Circuits/Systems, Computers and Communications (ITC-CSCC 2019)*, Jun. 2019.
44. Xuan Truong Nguyen, Jiwoong Choi, Hyuk-Jae Lee, and Hyun Kim*, "A Hardware-aware Compression Algorithm for Profiling DDR4 Memory Accesses," *2019 International Conference on Electronics, Information, and Communications (ICEIC)*, Jan. 2019.
45. Jiwoong Choi, Boyeal Kim, Hyuk-Jae Lee, and Hyun Kim*, "A Preprocessing Method for Improving the Compression Ratio of LPDDR4 Command Trace," *2019 International Conference on Electronics, Information, and Communications (ICEIC)*, Jan. 2019.
46. Duy Thanh Nguyen, Hyun Kim, Hyuk-Jae Lee, and Ik-joon Chang, "An approximate memory architecture for a reduction of refresh power consumption in deep learning applications," *IEEE*

International Symposium on Circuits and Systems (ISCAS 2018), May 2018.

47. Chulhee Lee, Hyun Kim, and Hyuk-Jae Lee, "Efficient GPU Implementation of a Sparse Affinity Tensor for High-order Graph Matching," *2018 International Conference on Electronics, Information, and Communications (ICEIC 2018)*, Jan. 2018.
48. Moonsoo Kim, Jungwoo Choi, Hyun Kim, and Hyuk-Jae Lee, "Exploiting Rowhammer Error Distribution for Reducing DRAM Errors," *2018 International Conference on Electronics, Information, and Communications (ICEIC 2018)*, Jan. 2018.
49. Dinh Van Luan, Nguyen Xuan Truong, Hyun Kim, and Hyuk-Jae Lee, "Implementation of the XY2-100 Protocol on Low-Cost Microcontroller," *2017 International SoC Design Conference (ISODC 2017)*, Nov. 2017.
50. Seung-Hwan Bae, Hyun Kim, and Hyuk-Jae Lee, "Data Layout and AMVP selection for Parallel Integer Motion Estimation in a Processing-in-Memory System," *The 32nd International Technical Conference on Circuits/Systems, Computers and Communications (ITC-CSCC 2017)*, Jul. 2017.
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Book Chapters

1. Hyuk-Jae Lee, Hyun Kim, and Chae Eun Rhee, “Chapter 5. E-R-D Optimization in Video Compression,” “Theory and Applications of Smart Cameras” by Springer, pp. 88-114, Jul. 2015.
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Patents

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2. Hyun Kim, Ji Hoon Jang, “ELECTRONIC DEVICE FOR PERFORMING PREFETCHER ALGORITHM SUITABLE FOR NEURAL NETWORK MODEL USING PHASE CHANGE MEMORY AND METHOD FOR OPERATION THEREOF,” PCT, 서울과학기술대학교 산학협력단, PCT/KR2023/000841, 2023년 1월 18일(출원).
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16. Hyun Kim, HYOKEUN LEE, Moonsoo Kim, Hyuk-Jae Lee, “SEMICONDUCTOR MEMORY DEVICE PERFORMING COMMAND MERGE OPERATION AND OPERATION METHOD THEREOF,” 미국, 서울대학교 산학협력단, 16/664,248, 2021년 7월 6일(등록, US11055025B2).
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18. Hyun Kim, Duy Thanh Nguyen, Boyeal Kim, Ik-joon Chang, Hyuk-Jae Lee, “APPROXIMATE MEMORY ARCHITECTURE AND DATA PROCESSING APPARATUS HAVING THE SAME,” 미국, 서울대학교 산학협력단, 16/539,313, 2021년 2월 9일(등록, US10916291B2).
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22. 김현, Duy Thanh Nguyen, 김보열, 장익준, 이혁재, “근사적 메모리 아키텍처 및 그를 이

용하는 데이터 처리장치,” 한국, 서울대학교 산학협력단, 10-2019-0062777, 2019년 5월 28일(출원).

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Invited Talks

- (24 November 2022) “System Semiconductor R&D Items - Mobile/Home Appliances, ” Public Hearing to Discover System Semiconductor R&D Promising Items.
- (3 August 2022) “Digital Systems Design of AI Accelerators for Mobile Devices, ” 2022 Summer Camp in Artificial Intelligence Semiconductor Convergence Training Center.
- (2 June 2022) “Design of Optimal AI Accelerator Platforms for Mobile Devices,” Expert Invited Talk in Incheon National University.
- (13 April 2022) “Design of Mobile AI Accelerator Platforms,” Expert Invited Talk in University of Seoul.
- (16 November 2021) “Towards Optimal Mobile AI Accelerator Platforms,” Expert Invited Talk in Seokyeong University.
- (15 October 2021) “Towards Smarter AI Platforms: Design of Self-Learnable Mobile AI Accelerator Platforms for Autonomous Driving,” Technical Lecture of Institute of Korean Electrical and Electronics Engineers.
- (8 October 2021) “Implementation of Optimal CNN Accelerators for Mobile Devices: Algorithm, Architecture, and Memory System Co-Design,” Special Session of 18th International SoC Design Conference (ISOCC 2021).
- (15 September 2021) “Overview of Mobile AI Accelerators,” CENTRA5.
- (19 August 2021) “Implementation of Self-Learnable Mobile AI Accelerator Platforms for Autonomous Driving, ” Emerging Technology in Electrical and Computer engineering Talks (e-TEC Talks) at Seoul National University Summer 2021.
- (18 August 2021) “Digital Systems Design of AI Semiconductors for Mobile Devices, ” 2021 Summer Camp in Artificial Intelligence Semiconductor Convergence Training Center.
- (20 July 2021) “Digital Systems Design of AI Semiconductor,” Hanyang University IDEC Seminar.
- (08 July 2021) “Co-designing Architectures, Algorithms, and Memory Systems for Mobile AI Accelerators,” 2021 SoC Workshop and Industry-Academic Exchange Meeting.
- (29 April 2021) “Overview, Necessity, and Research Trend of Mobile AI Accelerators,” Korea Industrial Education Institute Seminar on Technology Development, Competitiveness, and Market

Analysis in Three Strategic Areas of System Semiconductor.

- (08 February 2021) “Co-designing Architectures, Algorithms, and Memory Systems for AI Accelerators,” Sunmoon University Fourth Industrial Revolution Seminar.
- (27 January 2021) “Implementation of Dedicated Hardware Accelerator for Convolutional Neural Networks Based on Architecture, Algorithm and Memory System Co-Design,” Jeonbuk National University IT Convergence Research Center Seminar.
- (25 January 2021) “Co-designing Architectures, Algorithms, and Memory Systems for Deep Learning Hardware Accelerators,” The 28th Korean Conference on Semiconductors.
- (25 September 2020) “Optimization and Application of AI Semiconductor,” Hanyang University IDEC Seminar.
- (27 August 2020) “Deep Learning Accelerator Design and Its Application,” 2020 Summer Camp in Artificial Intelligence Semiconductor Convergence Training Center.
- (22 July 2020) “Deep Learning Architecture Design and Applications: Deep Learning Accelerator Design and Applications,” Summer Workshop in Institute of Korean Electrical and Electronics Engineers.
- (14 July 2020) “Deep Learning Accelerator Design: Accelerator & Memory Design for DNN and Its Application,” Gwangwoon University IDEC Seminar. 14 July 2020.
- (28 November 2019) “Camera-based Accurate and Fast Object Detector Using Localization Uncertainty for Autonomous Driving,” Seoul National University BK21+ Inter-university Semiconductor Research Center Joint Seminar.
- (17 July 2019) “SoC Design for Deep Learning Accelerator : Deep Learning Hardware Accelerator Design for Autonomous Driving,” Gwangwoon University IDEC Seminar.
- (8 April 2019) “AI Accelerator design & lab,” Hanyang University IDEC Seminar.
- (18 December 2018) “Deep Learning-based Image Processing for Autonomous Driving,” System Semiconductor Technology Exchange Meeting.
- (4 December 2018) “Efficient Memory Design for Deep Neural Network and Its Application,” 2nd Expert Invited Talk in Seokyeong University.
- (27 November 2018) “Hardware IP / SoC Design for Deep Neural Network and Its Application,” 1st Expert Invited Talk in Seokyeong University.
- (24 October 2018) “Hardware IP / SoC Designs for Autonomous Driving based on Deep Neural Networks,” 1st Semiconductor Industry-Academia Workshop
- (25 July 2018) “Hardware IP / SoC Designs for Low-Complexity Multimedia Processing and Its Application Systems,” Hyundai Motors Open R&D Seminar.
- (24 November 2017) “Low Power Memory Architecture for Deep Learning Hardware based on Approximation and Compression,” 2017 IEIE Fall Conference.
- (30 June 2017) “Implementation of Image Processing and Machine Learning based Video Surveillance System,” 2017 IEIE Summer Conference.

- Development for Processing Software on AI Semiconductor Devices, IITP (2022.07~2029.12)
- Development of phase change memory-based low-power memory platform for DNN inference on mobile devices, NRF (2022.06~2025.02)
- A Read Disturbance Tolerant Phase Change Memory System for CNN Inference Workloads, SEOULTECH (2022.06~2023.05)
- Development of circuits and architecture for 2T DRAM-based low-power and high-performance PIM cells, NRF (2022.04~2024.12)
- Development of Low Power AI Architecture for AIoT, KEIT (2022.04~2024.12)
- Development of reference frame compression/decompression algorithm, Realtek (2021.06~2022.01)
- Computational Parallelization of Deep Neural Networks on Heterogeneous Embedded Systems for Autonomous Driving, SEOULTECH (2021.09~2022.08)
- CNN-based Mask-Pose Fusion for Detecting Specific Persons on Heterogeneous Embedded Systems, SEOULTECH (2021.08~2022.07)
- Multidisciplinary Research Training and Development Enterprise for AI and Semiconductor Technology, NRF (2020.04~2025.12)
- Development of Self-learnable Mobile Recursive Neural Network Processor Technology, NRF (2020.04~2024.12)
- Development of AI Deep-Learning Processor and Module for 2,000 TFLOPS Server, IITP (2020.04~2027.12)
- Development of Deep Learning based Low-Power Image Processing SoC Platform for Autonomous Driving, NRF (2019.06~2022.02)
- Cloud-based smart energy town platform integrating energy blocks, NRF (2019.06~2028.02)
- DRAM/PRAM heterogeneous memory architecture and controller IC design technology research and development, KEIT (2017.07~2021.12)
- Development of Host-side DRAM Controller for NEWTON, SK Hynix (2020.07~2021.06)
- Development of Architecture Exploration of a Hard-wired PCM Controller, SK Hynix (2020.07~2021.06)
- An Approximate DRAM Design with an Adjustable Refresh Scheme for Low-power Deep Neural Networks, SEOULTECH (2020.03~2021.02)
- Embedded implementation of reinforcement learning-based scent, temperature, and humidity control module, Korea Testing Laboratory (2020.10~2020.11)
- An Effective PRAM Wear-Leveling Algorithm for Reducing Write Disturbance Error, SEOULTECH (2019.03~2020.02)
- Development of deep learning-based open EV platform technology capable of autonomous driving, KEIT (2017.11~2020.12)
- Developing Processing-in-Memory architecture for deep learning algorithms, Samsung Electronics (2015.07~2020.06)
- Development of PCM Disturbance Solution, SK Hynix (2019.07~2020.06)

- Development of Memory Scheduler Modeling and Verification Technique with RTL Design, SK Hynix (2019.07~2020.06)
 - Approximate memory architecture for high performance and low power deep learning hardware, Samsung Research Funding & Incubation Center for Future Technology (2016.12~2019.11)
 - SDM (Software-Defined Memory) solution, SK Hynix (2018.07~2019.06)
 - Development of Hot/Cold Detector algorithm and logic for Wear leveling (W/L), SK Hynix (2018.07~2019.06)
 - Real-time mobile traffic information system based on multisensory fusion and integration, IITP (2017.01~2018.08)
 - Development of high speed data compression IP, SK Hynix (2017.03~2017.12)
 - Disaster response robots imitate swarm organism and automatic assembly algorithm research, KOFAC (2016.06~2016.11)
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Outside Interests

- Baseball, Golf, Soccer