

Hyun Kim

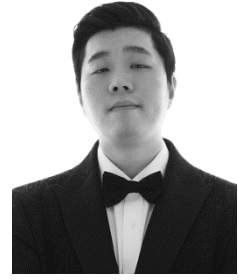
Associate Professor

Department of Electrical and Information Engineering

Seoul National University of Science and Technology, Seoul, Republic of Korea

Email: hyunkim@seoultech.ac.kr, Homepage: <http://idsl.seoultech.ac.kr>

Google Scholar: <https://scholar.google.co.kr/citations?user=mCuJPIUAAAJ&hl>



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 Professor** - Department of Electrical and Information Engineering, **Seoul National University of Science and Technology**, Seoul, Republic of Korea (2022.10. ~ Present)
- **Independent Director** - **Bigwave Robotics**, Seoul, Republic of Korea (2025.03. ~ Present)
- **Associate Director** - Research and Industry-University Cooperation Foundation, **Seoul National University of Science and Technology**, Seoul, Republic of Korea (2022.12. ~ 2023.12.)
- **Associate Director** - Leaders in INdustry-university Cooperation Center, **Seoul National University of Science and Technology**, Seoul, Republic of Korea (2022.12. ~ 2023.12.)
- **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.)
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Professional Activities

- Senior Member, Institute of Electrical and Electronics Engineers (IEEE)
- Member, IEEE Circuits and Systems Society & IEEE Computer Society
- Board of Executive Director, The Institute of Electronics and Information Engineers (IEIE)
- Board of Executive Director, IEIE Semiconductor Society
- Board of Executive Director, The Institute of Semiconductor Engineers (ISE)
- Board of Executive Director, Institute of Korean Electrical and Electronics Engineers (IKEEE)
- Life Member, IEIE
- Life Member, ISE
- Associate Editor, IEIE Transactions on Smart Processing and Computing
- Topic Editor, Electronics
- Peer Review for the Journals: 1) IEEE Transactions on Circuits and Systems for Video Technology, 2) IEEE Transactions on Circuits and Systems I: Regular Papers, 3) IEEE Transactions on Circuits and Systems II: Express Briefs, 4) IEEE Transactions on Computers, 5) IEEE Transactions on Very Large Scale Integration (VLSI) Systems, 6) IEEE Transactions on Neural Networks and Learning Systems, 7) IEEE Transactions on Emerging Topics in Computing, 8) IEEE Transactions on Instrumentation & Measurement, 9) IEEE Transactions on Consumer Electronics, 10) IEEE Transactions on Image Processing, 11) IEEE Access, 12) IEEE Signal Processing Letters, 13) IEEE Embedded Systems Letters, 14) ACM Transactions on Architecture and Code Optimization, 15) Neurocomputing, 16) IEIE Journal of Semiconductor Technology and Science
- Peer Review for the Conferences: 1) Conference on Neural Information Processing Systems (NeurIPS), 2) IEEE International Conference on Machine Learning (ICML), 3) International Conference on Learning Representations (ICLR), 4) AAAI Conference on Artificial Intelligence (AAAI), 5) IEEE/CVF Computer Vision and Pattern Recognition Conference (CVPR), 6) CVF/IEEE International Conference on Computer Vision (ICCV), 7) IEEE International Conference on Computer Design (ICCD), 8) IEEE International Conference on Artificial Intelligence Circuits and Systems (AICAS), 9) IEEE International Symposium on Circuits and Systems (ISCAS), 10) IEEE International Symposium on Embedded Multicore/Many-core Systems-on-Chip (MCSoc), 11) IEEE Asia Pacific Conference on Circuits and Systems (APCCAS)
- Organizing/Technical Program Committee (International Conference): 19) International Conf. on Electronics, Information, and Communication 2024 (TPC Chair), 18) IEEE/IEIE The Sixth International Conference on Consumer Electronics Asia 2021 (OC Co-Chair), 17) International Conf. on Electronics, Information, and Communication 2026, 16) 18th IEEE International Symposium on Embedded Multicore/Many-core Systems-on-Chip (MCSoc 2025), 15) 58th IEEE/ACM International Symposium on Microarchitecture (MICRO 2025), 14) 2025 IEEE International Conference on Consumer Electronics – Taiwan (ICCE-TW 2025), 13) The 22th International SoC Design Conference (ISOCC 2025), 12) 21th IEEE Asia Pacific Conference on Circuits and Systems (APCCAS 2025), 11) International Conf. on Electronics, Information, and Communication 2025, 10) The 21th International SoC Design Conference (ISOCC 2024), 9) 29th Asia and South Pacific Design Automation Conference (ASP-DAC) (Design Contest Chair), 8) 2023-2024 IEEE CASS Student Design Competition, 7) The

20th International SoC Design Conference (ISOCC 2023), 6) IEEE International Symposium on Integrated Circuits and Systems (ISICAS 2023), 5) International Conf. on Electronics, Information, and Communication 2023, 4) The 19th International SoC Design Conference (ISOCC 2022), 3) IEEE International Conference on Artificial Intelligence Circuits and Systems (AICAS) 2022, 2) IEEE Seoul Section Student Paper Contest 2021, 1) International Conf. on Electronics, Information, and Communication 2020

- Organizing/Technical Program Committee (Domestic Conference): 16) IEIE Summer Conference 2025 (TPC Chair), 15) The 7th ISE Winter Conference (TPC Chair), 14) The 33th Korean Conference on Semiconductors (KCS 2026), 13) IEIE SoC Conference 2025, 12) The 32th Korean Conference on Semiconductors (KCS 2025), 11) The 6th Future and Challenges of Memory-Centric Computers Workshop, 10) IEIE SoC Conference 2024, 9) The 31th Korean Conference on Semiconductors (KCS 2024), 8) The 5th Future and Challenges of Memory-Centric Computers Workshop, 7) IEIE SoC Conference 2023, 6) The 30th Korean Conference on Semiconductors (KCS 2023), 5) The 4th Future and Challenges of Memory-Centric Computers Workshop, 4) The 29th Korean Conference on Semiconductors (KCS 2022), 3) The 3rd Future and Challenges of Memory-Centric Computers Workshop, 2) IEIE SoC Conference 2021, 1) IEIE Summer Conf. 2018

- Verification Committee Member, Employment Examination for Seoul Civil Servant

- TF Committee Member, Intelligent Semiconductor Forum

Awards / Honors

- Openedge Technology Award, International SoC Design Conference 2025, Oct. 2025
- Outstanding Achievement Award in Research, Seoul National University of Science and Technology, 2025
- Grand Prize, Haedong Best Paper Award: Journal of Semiconductor Technology and Science, 2025
- IEIE-IEEE Joint Award for Young Scientist and Engineer, IEEE/IEIE, 2025
- Best Paper Award, 2025 IEIE Summer Conference
- Best Paper Award, 2025 IEIE Summer Conference
- Best Paper Award, 2025 IEIE Summer Conference
- Best Paper Award, The 32st Korean Conference on Semiconductors, 2025
- Best Paper Award, The 32st Korean Conference on Semiconductors, 2025
- Grand Prize, LINC 3.0 Project: Industry-Academia Joint Technology Development Initiative, 2025
- Grand Prize (President's Award of the Institute of Information & Communications Technology Planning & Evaluation), AI Semiconductor Human Resource Development Project, 2025
- Best Paper Award Gold Prize, ICEIC, 2025
- Best Paper Award, The 7th Winter Conference of the Institute of Semiconductor Engineers, 2025
- Best Paper Award, The 7th Winter Conference of the Institute of Semiconductor Engineers, 2025
- Best Student Paper Award with Gold Prize, IEEE Seoul Section Student Paper Contest, 2024
- Best Student Paper Award with Bronze Prize, IEEE Seoul Section Student Paper Contest, 2024

- Best Student Paper Award with Bronze Prize, IEEE Seoul Section Student Paper Contest, 2024
- Achievement Award, IEIE Semiconductor Society, 2024
- Korea Semiconductor Industry Association President Award, 17th Semiconductor Day Award for Contributions to the Advancement of the Semiconductor Industry, 2024
- Excellence Award, 2024 SeoulTech-Think Seoul Living Lab Idea Contest, 2024
- Best Paper Award, The 31st Korean Conference on Semiconductors, 2024
- Outstanding Achievement Award in Research, Seoul National University of Science and Technology, 2024
- 2023-2024 Student Design Competition Winner in Seoul Chapter, IEEE Circuits and Systems Society, 2024
- Grand Prize, 29th Asia and South Pacific Design Automation Conference (ASP-DAC2024) University LSI Design Contest, 2024
- Gold Prize, 29th Asia and South Pacific Design Automation Conference (ASP-DAC2024) University LSI Design Contest, 2024
- Haedong Young Engineer Award, HAEDONG SCIENCE FOUNDATION, 2023
- Best Student Paper Award with Bronze Prize, IEEE Seoul Section Student Paper Contest, 2023
- Best Student Paper Award with Bronze Prize, IEEE Seoul Section Student Paper Contest, 2023
- Best Student Paper Award with Bronze Prize, IEEE Seoul Section Student Paper Contest, 2023
- Excellence Award, 2023 WISSET, IEIE
- Outstanding Associate Editor Award, IEIE Transactions on Smart Processing and Computing, 2023
- 2022-2023 Student Design Competition Winner in Asia, Australia, and the Pacific, IEEE Circuits and Systems Society, 2023
- 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: IEIE Transactions on Smart Processing & Computing, 2021
- Best Paper Award Silver Prize, IEEE/IEIE ICCE-ASIA, 2021
- Outstanding Achievement Award in Education, 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
-

Lab (Intelligent Digital Systems Design Lab) Status (Sep. 2025)

- Ph.D Course: 10, M.S. Course: 14, Research Intern: 4
 - Ph.D graduates: 1, M.S. graduates: 18, Undergraduate graduates: 23
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International Journal Publications (* : Corresponding Author)

- **Submitted**
 - Inseong Hwang, Ji Hoon Jang, Chaewon Park, and Hyun Kim*, "HERMeS: High-Fidelity and High-Speed Emulation with a Reconfigurable Framework for DRAM-Based Processing-in-Memory Systems," *IEEE Transactions on Circuits and Systems I*.
 - Gilhyeon Lee, Seonggeun Kim, Dongjun Lee, Kyungmin Goh, and Hyun Kim*, "Towards Efficient Language Giants: A Comprehensive Survey on Structural Optimizations and Compression Techniques for Large Language Models," *Neural Networks*.
 - Youngchan Kim, Seokkyu Yoon, Sungsoo Han, Chaewon Park, Junoh Park, Junha Go, and Hyun Kim*, "Accelerating Language Giants: A Survey of Optimization Strategies for LLM Inference on Hardware Platforms," *Journal of Systems Architecture*.
 - Huibeom Kang, Dahun Choi, and Hyun Kim*, "LiGHt-ViT: Quantization-Aware Linear and Grouped Hybrid Attention Mechanisms for Boosting Vision Transformers," *IEEE Transactions on Multimedia*.
 - Seungil Lee and Hyun Kim*, "Trust-DETR: Enhancing Token Sparsity in Transformer-Based Object Detection Using Aleatoric and Epistemic Uncertainty Metrics," *IEEE Transactions on Multimedia*.
 - Inseong Hwang, Ji Hoon Jang, and Hyun Kim*, "Where Do Memory Bottlenecks Occur During DNN Inference? An Architectural Analysis for PIM Design," *Journal of Parallel and Distributed Computing*.
 - Soomin Kim, Yeji Lee, Chan-Gi Yook, Inseong Hwang, Wonbo Shim, Hyun Kim, and Seongjae Cho*, "Asymmetric Vertically-Layered Ultra-Thin All-Si Channel Two-Transistor Dynamic Random-Access Memory for Processing-in-Memory Application," *SusMat*.
 - Sangbeom Jeong, Seungil Lee, and Hyun Kim*, "GQ-Train: Gradient Quantization-Aware CNN Training with Adaptive Thresholding and Hardware-Friendly Stochastic Rounding Unit," *IEEE Transactions on Multimedia*.
 - Kwanghyun Koo, Sunwoong Kim, and Hyun Kim*, "SPEED: Structured Kernel Block Pruning with Filter Groups for Efficient and Elastic SW-HW Co-Design in FPGA-Based CNN Accelerators," *Neurocomputing*.
 - Sungrae Kim, Sungho Suh, and Hyun Kim*, "A groundbreaking hybrid intelligence model for stock price prediction: Synergizing logistic regression for long positions with a multilayer perceptron classifier for short positions," *Expert Systems*.
 - NamJoon Kim, Beom Jin Kang, Hae In Lee, Seokkyu Yoon, Youngchan Kim, Sungsoo Han, Seok-

- Bum Ko, and Hyun Kim*, “FLASH: Energy-Efficient FPGA Acceleration via Linear Approximation and Streamlined Two-Stage Pipeline Architectures for Quantized CNN-Transformer Hybrid Networks,” *IEEE Transactions on Neural Networks and Learning Systems*.
- Gilhyeon Lee, Inseong Hwang, Junghyeok Lee, Jihoon Jang, and Hyun Kim*, “SPARE: Sparsity-Preserving Attention Replacement for Efficient PIM-based LLM Inference,” *IEEE Transactions on Computers*.
 - Gilha Lee, Seungil Lee, and Hyun Kim*, “SCORE: Similarity-Aware Contextual Overlap-Redundancy Eviction for Efficient KV Cache Compression in LLMs,” *IEEE Transactions on Multimedia*.
 - • **Published** (Sort by publication date)
 1. Junha Go, Dongjun Lee, Youngchan Kim, and Hyun Kim*, “AUTO-Accel: A SW/HW Co-Design Framework with Adaptive Unified Buffer Mapping and Power-of-Two Quantization for FPGA-Based Object Detection Accelerators,” *Journal of Real-Time Image Processing*.
 2. Youngchan Kim, Nam Joon Kim, and Hyun Kim*, “FAB: FPGA-Accelerated Fully-Pipelined Bottleneck Architecture with Batching for High-Performance MobileNetv2 Inference,” *IEEE Transactions on Circuits and Systems I*, Vol. 72, No. 11, pp. 6615-6628, Nov. 2025.
 3. Hyeonseok Hong and Hyun Kim*, “VFT: A Versatile Fine-Tuning Scheme based on Feature Distribution-aware Knowledge Distillation for Lightweight Convolutional Neural Networks,” *Engineering Applications of Artificial Intelligence*, Vol. 159, 111597, Nov. 2025.
 4. Gilha Lee, Jin Shin, and Hyun Kim*, “VFF-Net: Evolving Forward-Forward Algorithms into Convolutional Neural Networks for Enhanced Computational Insights,” *Neural Networks*, Vol. 190, 107696, Oct. 2025.
 5. Juntae Park, Dahun Choi, and Hyun Kim*, “RADAR: An Efficient FPGA-based ResNet Accelerator with Data-Aware Reordering of Processing Sequences,” *Journal of Semiconductor Technology and Science*.
 6. Muhammad Yasir Siddiqui and Hyun Kim*, “BN-SNN: Spiking neural networks with bistable neurons for object detection,” *PLOS ONE*, Vol. 20, No. 7, e0327513, Jul.2025.
 7. Muhammad Yasir Siddiqui and Hyun Kim, “Attention-Based Deep Feature Aggregation Network for Skin Lesion Classification,” *Electronics*, Vol. 14, No. 12, 2364, Jun. 2025.
 8. Seungyong Lee, Sanghyun Lee, Minseok Seo, Chunmyung Park, Woojae Shin, Hyuk-Jae Lee, and Hyun Kim*, “NPC: A Non-conflicting Processing-in-memory Controller in DDR Memory Systems,” *IEEE Transactions on Computers*, Vol. 74, No. 3, pp. 1025-1039, Mar. 2025.
 9. Muhammad Yasir Siddiqui and Hyun Kim*, “Lightweight Deepfake Detection based on Multi Feature Fusion,” *Applied Sciences*, Vol. 15, No. 4, p. 1954, Feb. 2025.
 10. Seung-Hwan Bae, Hyuk-Jae Lee, and Hyun Kim*, “MCM-SR: Multiple Constant Multiplication-based CNN Streaming Hardware Architecture for Super-Resolution,” *IEEE Transactions on Very Large Scale Integration (VLSI) Systems*, Vol. 33, No. 1, pp. 75-87, Jan. 2025.
 11. Inseong Hwang, Junghyeok Lee, Huibeom Kang, Gilhyeon Lee, and Hyun Kim*, “Survey of CPU and Memory Simulators in Computer Architecture: A Comprehensive Analysis Including Compiler Integration and Emerging Technology Applications,” *Simulation Modeling Practice and Theory*, Vol. 138, pp. 103032-103046, Jan. 2025.
 12. Dahun Choi, Juntae Park, and Hyun Kim*, “HLQ: Hardware-Friendly Logarithmic Quantization

- Aware Training for Power-Efficient Low-Precision CNN Models,” *IEEE Access*, Vol. 12, pp. 159611-159621, 2024.
13. Hyeonseok Hong, Dahun Choi, Nam Joon Kim and Hyun Kim*, “Mobile-X: Dedicated FPGA Implementation of the MobileNet Accelerator Optimizing Depthwise Separable Convolution,” *IEEE Transactions on Circuits and Systems II: Express Briefs*, Vol. 71, No. 11, pp. 4668-4672, Nov. 2024.
 14. Beomjin Kang, Haein Lee, Seokkyu Yoon, Youngchan Kim, Sangbeom Jeong, Seongjun O, and Hyun Kim*, “A Survey of FPGA and ASIC Designs for Transformer Inference Acceleration and Optimization,” *Journal of Systems Architecture*. Vol. 155, pp. 103247-103264, Oct. 2024.
 15. Jong Ho Lee and Hyun Kim*, “DCT-ViT: High-Frequency Pruned Vision Transformer with Discrete Cosine Transform,” *IEEE Access*, Vol. 12, pp. 80386-80396, 2024.
 16. Kwanghyun Koo, Seungil Lee, Jong Ho Lee, Gilha Lee, Sangbeom Jeong, Seong Jun O, and Hyun Kim*, “Vision Transformer Models for Mobile/Edge Devices: A Survey,” *Multimedia Systems*, Vol. 30, No. 109, pp. 1-18, Apr. 2024.
 17. Dahun Choi, Hyunseock Hong, Namjoon Kim, Haein Lee, Beomjin Kang, Huibeom Kang, and Hyun Kim*, “A Survey of CNN Accelerators on FPGA Platforms: Architectures and Optimization Techniques,” *Journal of Real-Time Image Processing*, Vol. 21, No. 64, pp. 1-21, Mar. 2024.
 18. Dayoung Chun, Seung Il Lee, and Hyun Kim*, “Uncertainty-based One-phase Learning to Enhance Pseudo Label Reliability for Semi-supervised Object Detection,” *IEEE Transactions on Multimedia*, Vol. 26, pp. 6336-6347, 2024.
 19. Nam Joon Kim and Hyun Kim*, “Trunk Pruning: Highly Compatible and Versatile Channel Pruning Without Fine-Tuning,” *IEEE Transactions on Multimedia*, Vol. 26, pp. 5588-5599, 2024.
 20. Jeong Jun Lee and Hyun Kim*, “Multi-step Training Framework Using Sparsity Training for Efficient Utilization of Accumulated New Data,” *IEEE Access*, Vol. 11, pp. 129613-129622, 2023.
 21. Kwanghyun Koo and Hyun Kim*, “V-SKP: Vectorized Kernel-based Structured Kernel Pruning for Accelerating Deep Convolutional Neural Networks,” *IEEE Access*, Vol. 11, pp. 118547-118557, 2023.
 22. Nam Joon Kim and Hyun Kim*, “FP-AGL: Filter Pruning with Adaptive Gradient Learning for Accelerating Deep Convolutional Neural Networks,” *IEEE Transactions on Multimedia*, Vol. 25, pp. 5279-5290, 2023.
 23. Ji Hoon Jang, Jin Shin, Juntae Park, Inseong Hwang, and Hyun Kim*, “An In-depth Survey of Processing-in-Memory Architectures for Deep Neural Networks,” *Journal of Semiconductor Technology and Science*, Vol. 70, No. 10, pp. 3882-3886, Oct. 2023.
 24. Subin Ki, Juntae Park, and Hyun Kim*, “Dedicated FPGA Implementation of the Gaussian TinyYOLOv3 Accelerator,” *IEEE Transactions on Circuits and Systems II: Express Briefs*, Vol. 70, No. 10, pp. 3882-3886, Oct. 2023.
 25. Jin Shin, Jong Ho Lee, and Hyun Kim*, “LL-FMC: Low-latency Frame Memory Compression Scheme with High Reconstructed Quality,” *IET Electronics Letters*, Vol. 59, No. 14, pp. e12893, Jul. 2023.
 26. Dayoung Chun, Jiwoong Choi, Hyuk-Jae Lee, and Hyun Kim*, “CP-CNN: Computational Parallelization of CNN-based Object Detectors in Heterogeneous Embedded Systems for Autonomous Driving,” *IEEE Access*, Vol. 11, pp. 52812-52823, May 2023.

27. Hyeokun Lee, Seungyong Lee, Byeongki Song, Moonsoo Kim, Seokbo Shim, Hyeok-Jae Lee, and Hyun Kim*, "An In-Module Disturbance Barrier for Mitigating Write Disturbance in Phase-Change Memory," *IEEE Transactions on Computers*, Vol. 72, No. 4, pp. 1150-1162, Apr. 2023.
28. Jongho Lee and Hyun Kim*, "Discrete Cosine Transformed Images Are Easy To Recognize in Vision Transformer," *IEIE Transactions on Smart Processing & Computing*, Vol. 12, No. 1, pp. 48-54, Feb. 2023.
29. 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.
30. Jiwoong Choi, Dayoung Chun, Hyeok-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.
31. Hyeokun Lee, Hyeok-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.
32. 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.
33. Moonsoo Kim, Hyeokun Lee, Hyun Kim*, and Hyeok-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.
34. 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.
35. 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.
36. Duy Thanh Nguyen, Hyun Kim*, and Hyeok-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.
37. Seungyong Lee, Hyeokun Lee, Hyeok-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.
38. Duy Thanh Nguyen, Hyun Kim*, and Hyeok-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.
39. Quan-Dung Pham, Xuan Truong Nguyen, Khac-Thai Nguyen, Hyun Kim*, and Hyeok-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.
40. Moonsoo Kim, Juhan Lee, Hyun Kim*, and Hyeok-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.
41. 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.

42. 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.
43. 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.
44. 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.
45. 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.
46. 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.
47. 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.
48. 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.
49. 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.
50. 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.
51. 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.
52. 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.
53. 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.
54. 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.
55. 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.

56. 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.
57. 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.
58. 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.
59. 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.
60. 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.
61. 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.

International Conference Publications (* : Corresponding Author)

- **Submitted**

- Jin Shin, Seonggeun Kim, and Hyun Kim*, "MVP-PIM: Data Mapping Optimization and Versatile Processing Unit Design for DRAM-Based Process-in-Memory Architectures," *2026 ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS 2026)*. **(IF: 4, NRF BK21+)**
- Jihoon Jang, Inseong Hwang, and Hyun Kim*, "GPPIM: General-Purpose Programmable PIM with a Dual-Tier ISA for End-to-End Semantic Fusion," *2026 ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS 2026)*. **(IF: 4, NRF BK21+)**.
- Inseong Hwang, Jihoon Jang, and Hyun Kim*, "NEXUS: Heterogeneous NPU-PIM EXecution with Unified Memory Subsystem for Dynamic Workload Partitioning," *2026 ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS 2026)*. **(IF: 4, NRF BK21+)**.
- Seungil Lee, Gilha Lee, and Hyun Kim*, "SPLIT-VLM: Saliency-Guided Partitioning towards Local Coverage for Importance-Aware Token Dropping in Vision-Language Models," *The Fourteenth International Conference on Learning Representations (ICLR 2026)*.
- Huibeom Kang, Dahun Choi, and Hyun Kim*, "SLAKE: Softmax-Approximated Training-Free Linear Attention with KV-Cache Eviction for Long-Sequence LLMs," *The Fourteenth International Conference on Learning Representations (ICLR 2026)*.
- Chaewon Park, Inseong Hwang, Beom Jin Kang, and Hyun Kim*, "CORE: Compact, Optimized, and Resource-Efficient Compute Engine for FP-INT GEMM Acceleration with Binary Coding Quantization," *63rd ACM/IEEE The Chips to Systems Conference (DAC 2026)*. **(IF: 3, NRF BK21+)**

- Kyungmin Goh, Gilha Lee, and Hyun Kim*, “MoE-KR: Hardware-efficient Mixture-of-Experts Compression via K-means Cluster and R-Rank Decomposition,” *Design, Automation and Test in Europe Conference 2026 (DATE 2026)*. (IF: 2, NRF BK21+)
- Youngchan Kim, Nam Joon Kim, and Hyun Kim*, “FAST-MoE: FPGA Acceleration of Sparsity-Tailored MoE-LLM with Dynamic Unstructured Pruning-and-Address Scheduling,” *63rd ACM/IEEE The Chips to Systems Conference (DAC 2026)*. (IF: 3, NRF BK21+)
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- Tackwoo Nam, Gilha Lee, and Hyun Kim*, “ADORE-VLM: Attention-Dynamics–Oriented Re-Entry–Based Early Exiting for Accelerating Vision–Language Model Inference,” *IEEE International Symposium on Circuits and Systems (ISCAS 2025)*.
- **Published** (Sort by publication date)
 1. Seokkyu Yoon, Nam Joon Kim, and Hyun Kim*, “LUT-APP: Dynamic-Precision LUT-based Approximation Unifying Non-Linear Operations in Transformers,” *Design, Automation and Test in Europe Conference 2026 (DATE 2026)*, Mar. 2026. (IF: 2, NRF BK21+)
 2. Sungsoo Han, Dahun Choi, and Hyun Kim*, “BOLD-Q: Blockwise Outlier-aware Logarithmic Dual-Bias Quantization for Hardware-Efficient LLM Inference,” *Design, Automation and Test in Europe Conference 2026 (DATE 2026)*, Mar. 2026. (IF: 2, NRF BK21+)
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 34. 김현, 홍현석, “지식증류 기반 미세 조정을 통한 CNN 모델을 경량화하는 전자 장치 및 그 동작 방법,” 한국, 서울과학기술대학교 산학협력단, 10-2024-0009509, 2024년 1월 22일(출원).
 35. 김현, 장지훈, “비휘발성 메모리를 이용하여 심층신경망용 프리패처 알고리즘을 수행하기 위한 전자 장치 및 그 구동 방법,” 한국, 서울과학기술대학교 산학협력단, 10-2024-0006172, 2024년 01월 15일(출원).
 36. 김현, 신진, “개선된 STEM 계층을 통한 도메인 적응성 강화 방법 및 이를 수행하는 장치,” 한국, 서울과학기술대학교 산학협력단, 10-2023-0183442, 2023년 12월 15일(출원).
 37. 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).
 38. Hyun Kim, Seung Il Lee, “ELECTRONIC DEVICE FOR PROCESSING LEARNING DATA IN NEURAL NETWORK MODEL USING UNCERTAINTY VALUE AND METHOD FOR OPERATION THEREOF,” PCT, 서울과학기술대학교 산학협력단, PCT/KR2023/000832, 2023년 1월 18일(출원).
 39. 김현, 장지훈, “상변화 메모리를 이용하여 신경망 모델에 적합한 프리패처 알고리즘을 수행하는 전자 장치 및 그 동작 방법,” 한국, 서울과학기술대학교 산학협력단, 10-2022-0184810, 2022년 12월 26일(출원).
 40. 김현, 구광현, “신경망 모델에 대한 커널 프루닝을 수행하는 전자 장치 및 그 동작 방법,” 한국, 서울과학기술대학교 산학협력단, 10-2022-0184809, 2022년 12월 26일(출원).
 41. 김현, 이종호, “주파수 도메인에서의 토큰 프루닝을 수행하는 전자 장치 및 그 동작 방법,” 한국, 서울과학기술대학교 산학협력단, 10-2022-0184327, 2022년 12월 26일(출원).
 42. 김현, 최다훈, “향상된 로그 양자화 기법을 이용하여 신경망 모델을 훈련시키기 위한 전자 장치 및 그 동작 방법,” 한국, 서울과학기술대학교 산학협력단, 10-2022-0179440, 2022년 12월 20일(출원).

43. 김현, 이정준, “최소성 학습에 기반한 심층 신경망의 지속적인 학습 방법,” 한국, 서울과학기술대학교 산학협력단, 10-2021-0187387, 2021년 12월 24일(출원).
44. Hyun Kim, Nam Joon Kim, “FILTER PRUNING METHODS FOR DEEP NEURAL NETWORKS BASED ON SPARSITY TRAINING,” PCT, 서울과학기술대학교 산학협력단, PCT/KR2021/017227, 2021년 11월 23일(출원).
45. 김현, 김남준, “심층신경망을 위한 최소성 학습 기반 필터 프루닝 기법,” 한국, 서울과학기술대학교 산학협력단, 10-2021-0160472, 2021년 11월 19일(출원).
46. 김현, 이종호, 주혜린, 이재인, 송이삭, “무인 결제 시스템,” 한국, 서울과학기술대학교 산학협력단, 10-2021-0026699, 2021년 2월 26일(출원).
47. 김현, Duy Thanh Nguyen, 김보열, 장익준, 이혁재, “근사적 메모리 아키텍처 및 그를 이용하는 데이터 처리장치,” 한국, 서울대학교 산학협력단, 10-2019-0062777, 2019년 5월 28일(출원).
48. 김현, 노승문, 이혁재, “DWT 계수를 적용한 SPIHT 알고리즘 및 그 알고리즘을 이용하는 데이터 처리 장치,” 한국, 서울대학교 산학협력단, 10-2019-0051584, 2019년 5월 2일(출원).

Technology Transfer

1. Hyun Kim, “GW2110-Based Vision Task SW Solution and AI Semiconductor Education Tutorial,” GWANAK ANALOG, 24-Nov-2024.

Invited Talks

- (04 December 2025) “Green AI at Scale: Energy-Efficient AI Semiconductors Unleash LLM Innovation,” The 5th Digital Transformation Megatrend Conference.
- (03 December 2025) “Revolutionizing On-Device AI: Designing Optimal Hardware Accelerator Platforms for On-Device Computing,” Expert Invited Talk in Samsung Advanced Institute of Technology (SAIT)
- (05 November 2025) “AI on Silicon: From Algorithms to Chips,” Expert Invited Talk in Hanyang University.
- (22 October 2025) “From AI Models to Silicon: Algorithm–Architecture–Memory Co-Design for Power-Efficient AI Accelerators,” 2025 The Korean Physical Society Fall Meeting.
- (29 September 2025) “Fundamentals of AI Semiconductors,” Expert Invited Talk in University of Seoul.
- (10 September 2025) “AI Semiconductor Design and Application,” Convergence Open Sharing System for Semiconductor Materials, Parts and Equipment: A Conversation with a Semiconductor Luminary.
- (8 August 2025) “Recent Trends in Hardware-Software Co-Design for On-Device AI Acceleration,” 2025 The Korean Institute of Broadcast and Media Engineers Summer Workshop.
- (22 May 2025) “Realizing On-Device AI: Domain-Specific AI Acceleration and Optimization for

Edge/Mobile Devices,” 2025 On-device AI Semiconductor Workshop.

- (17 April 2025) “Optimized Lightweight Mobile Self-Learning Technology and Dedicated Acceleration IP Solution for On-Device AI,” 2025 Software Convergence Symposium (SWCS 2025).
- (20 March 2025) “Development of Lightweight Mobile Self-Learning Technology and Dedicated Acceleration IP,” Expert Invited Talk in Korea Electronics Technology Institute.
- (12 November 2024) “Design and Optimization of Dedicated Accelerators for On-Device AI,” 2024 Next-Generation System Semiconductor Design Professional Training Project Workshop.
- (11 October 2024) “Revolutionizing On-Device AI: Designing Optimal Accelerator Platforms for On-Device Computing,” Intelligent Semiconductor Workshop.
- (30 August 2024) Hyun Kim, “SOTA Technology Trends in Artificial Intelligence Semiconductor Systems,” Expert Invited Talk in Korea University.
- (10 July 2024) Hyun Kim, “Digital Systems Design of AI Accelerators for Mobile Devices,” Expert Invited Talk in Korea National University of Transportation.
- (25 June 2024) Hyun Kim, “Dedicated Hardware Platform Technology for On-Device AI Acceleration,” National Strategic Technology Briefing and Consultation.
- (29 February 2024) Hyun Kim, “SOTA Technology Trends in Artificial Intelligence Semiconductor Systems,” Expert Invited Talk in Korea National University of Transportation.
- (29 February 2024) Hyun Kim, “AI Benchmark Framework,” Expert Invited Talk in Ewha Womans University.
- (01 November 2023) Hyun Kim, “AI Optimization & AI Accelerator Design for Mobile Devices,” AI Technology Transfer Briefing Session.
- (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.
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Research Funding

- Development and Demonstration of On-Device AI Semiconductor for Manufacturing Automation Robots through sVLM-Based Situational Awareness, KEIT (2025.04~2028.12)
- Development of Secure, High-Performance, and High-Connectivity Chiplet-SoC Architecture), KEIT (2025.04~2027.12)
- Development of Intelligent Home On-Device AI Matter Hub System Technology, IITP (2025.04~2028.12)
- Development of Transformer Acceleration Solution Including Quantization and Scheduling Techniques for LLM, KEIT (2024.04~2026.12)
- Development of AI Accelerator-based Edge AI Application for On-device AI, LINC 3.0 & GWANAK ANALOG (2024.05~2024.11)
- Artificial Intelligence (AI) Semiconductor Human Resource Development, IITP (2024.05~2025.02)
- 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)
- 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)
- 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 (2020.04~2025.06)
- Development of AI Deep-Learning Processor and Module for 2,000 TFLOPS Server, IITP (2020.04~2026.12)
- Cloud-based smart energy town platform integrating energy blocks, NRF (2019.06~2028.02)
- Development of Deep Learning based Low-Power Image Processing SoC Platform for Autonomous Driving, NRF (2019.06~2022.02)
- Embedded implementation of reinforcement learning-based scent, temperature, and humidity control module, Korea Testing Laboratory (2020.10~2020.11)
- Development of deep learning-based open EV platform technology capable of autonomous driving, KEIT (2017.11~2020.12)

- DRAM/PRAM heterogeneous memory architecture and controller IC design technology research and development, KEIT (2017.07~2021.12)
- Real-time mobile traffic information system based on multisensory fusion and integration, IITP (2017.01~2018.08)
- Approximate memory architecture for high performance and low power deep learning hardware, Samsung Research Funding & Incubation Center for Future Technology (2016.12~2019.11)
- Disaster response robots imitate swarm organism and automatic assembly algorithm research, KOFAC (2016.06~2016.11)
- Enhancing Large Language Models with Lightweight Techniques through Hardware Acceleration Solutions, SEOULTECH (2025.03~2026.02)
- Enabling Low-Power CNN Inference on Edge Devices Using Prefetcher-Assisted NVM Systems, SEOULTECH (2024.07~2025.06)
- High-Frequency Pruned Vision Transformer with Discrete Cosine Transform, SEOULTECH (2023.07~2024.06)
- An In-depth Survey of Processing-in-Memory Architectures for Deep Neural Networks, SEOULTECH (2022.10~2023.09)
- A Read Disturbance Tolerant Phase Change Memory System for CNN Inference Workloads, SEOULTECH (2022.06~2023.05)
- 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)
- An Approximate DRAM Design with an Adjustable Refresh Scheme for Low-power Deep Neural Networks, SEOULTECH (2020.03~2021.02)
- An Effective PRAM Wear-Leveling Algorithm for Reducing Write Disturbance Error, SEOULTECH (2019.03~2020.02)

Teaching Experience

- System-on-a-Chip Design for Multimedia, (Spring 2024, Spring 2022, Spring 2021, Spring 2019), Seoul National University of Science and Technology
- Hardware Design for Deep Learning, (Fall 2024, Fall 2022, Fall 2021, Fall 2020), Seoul National University of Science and Technology
- Deep Learning Hardware Application, (Spring 2025, Spring 2023), Seoul National University of Science and Technology
- Topics in Computer and VLSI, (Fall 2023), Seoul National University of Science and Technology
- Digital System Design, (Spring 2025, Spring 2024, Spring 2023, Spring 2022, Spring 2021, Spring 2020, Spring 2019), Seoul National University of Science and Technology
- Digital Logic Circuit, (Spring 2025, Spring 2024, Spring 2023, Spring 2022, Spring 2021, Spring 2020), Seoul National University of Science and Technology

- Computer Architecture, (Fall 2024, Fall 2023, 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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Outside Interests

- Baseball, Golf, Soccer