Se-Min Ryan Lim

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Professional Experience

Kookmin University
Seoul, S.Korea

Assistant Professor
Sep. 2025 - Current

- Pioneering application-driven system architectures that sustain lasting performance improvement in the post-Moore's Law era through cross-layer optimization and heterogeneous computing innovations.

Semiconductor Research Corporation (SRC)
Irvine, CA, U.S.A

Research Scholar
Jan. 2023 - Jun. 2025

- Implemented prototype CPU-FPGA heterogeneous systems with novel system architectural solutions for various applications, including clustering and bioinformatics.

University of California, Irvine
Irvine, CA, U.S.A

Graduate Student Researcher
Sep. 2020 - Jun. 2025

- Implemented prototype CPU-FPGA heterogeneous systems with novel system architectural solutions for various applications, including neural networks, cloud platforms, floating-point compression, and boolean satisfiability problem solver.

Korea University
Seoul, S.Korea

Visiting Researcher
Nov. 2019 - Aug. 2020

- Implemented specialized neural networks for human activity recognition.

Korea University Research & Business Foundation
Seoul, S.Korea

Researcher
Apr. 2019 - Oct. 2019

- Implemented FPGA-based end-to-end hardware accelerators for neural network inference.

Korea University
Seoul, S.Korea

Graduate Research Assistant
Mar. 2017 - Feb. 2019

- Implemented efficient digital ALU logic.
- Implemented FPGA-based end-to-end hardware accelerators for neural network inference.
- Implemented specialized neural networks for human activity recognition.

Korea University
Seoul, S.Korea

Undergraduate Research Assistant
Mar. 2015 - Feb. 2017

- Implemented special-purpose embedded systems and IoT devices.

Research Interests

"Application-driven, cross-layer system architectural innovations considering emerging accelerators and their real-world implementations"

System Architecture

Hardware Accelerators

Software-Hardware Co-Design

Memory or Storage-Centric Processing

Education

University of California, Irvine

Doctor of Philosophy in Computer Science *Sep. 2020 - May. 2025*

- Advisor: Prof. Sang-Woo Jun
- Committee: Prof. Sang-Woo Jun, Prof. Nikil Dutt, and Prof. Hyoukjun Kwon
- Thesis Title: Application-Driven Cross-Layer Optimizations for CPU-FPGA Heterogeneous Systems

Korea University

Master of Engineering in Electronics Engineering *Mar. 2017 - Feb. 2019*

- Advisor: Prof. Hyeong-Cheol Oh

Korea University

Bachelor of Engineering in Electronics Engineering *Mar. 2011 - Feb. 2017*

Publications

[1] **Se-Min Lim** and Sang-Woo Jun, "Wakanda: Scalable Graph Neural Networks via Near-Storage Accelerated Graph Database," *Preparing submission*, 2026.

[2] **Se-Min Lim**, Quang Anh Hoang, and Sang-Woo Jun, "Jarvis: CPU-FPGA Heterogeneous Platform for Boolean Satisfiability Problem Solver," *Preparing submission*, 2026.

[3] **Se-Min Lim**, Seongyoung Kang, Gongjin Sun, and Sang-Woo Jun, "GableSort: Scalable Sorting Beyond Memory Capacity via Adaptive ColumnSort Acceleration," *Preparing submission*, 2026.

[4] Esmerald Aliaj, **Se-Min Lim**, and Sang-Woo Jun, "FMiner: Accelerating Frequent Item Set Mining using FPGAs," *Preparing submission*, 2026

[5] Seongyoung Kang, **Se-Min Lim**, and Sang-Woo Jun, "Lembas: External Memory Long Read Alignment Acceleration for Affordable De Novo Assembly," *International Conference on Architectural Support for Programming Languages and Operating Systems **(ASPLOS)***, 2026. [Under Review]

[6] **Se-Min Lim**, Seongyoung Kang, and Sang-Woo Jun, "Bancroft: Genomics Acceleration Beyond On-Device Memory," *International Conference on Parallel Architecture and Compilation Techniques **(PACT)***, 2025.

[7] Gongjin Sun, Seongyoung Kang, Jane He, **Se-Min Lim**, and Sang-Woo Jun, "Labidus: RISC-V Overlay with Streaming Asynchronous Custom Instructions," *IEEE International Conference on Application-specific Systems, Architectures, and Processors **(ASAP)***, 2025.

[8] **Se-Min Lim**, "Application-Driven Cross-Layer Optimizations for CPU-FPGA Heterogeneous Systems," ***PhD Dissertation**, University of California, Irvine*, 2025.

[9] **Se-Min Lim**, Esmerald Aliaj, and Sang-Woo Jun, "Durin: CPU-FPGA Heterogeneous Platform for Scalable Low-Dimensional Data Clustering," *IEEE International Conference on Big Data **(BigData)***, 2024.

[10] **Se-Min Lim**, Esmerald Aliaj, and Sang-Woo Jun, "Morbius: Platform-Adaptive Hardware Accelerator for Scalable Sequence Motif Discovery," *IEEE International Conference on e-Science **(e-Science)***, 2024.

[11] **Se-Min Lim** and Sang-Woo Jun, "FlexForge: Efficient Reconfigurable Cloud Acceleration via Peripheral Resource Disaggregation," *Design, Automation, and Test in Europe Conference **(DATE)***, 2024.

[12] **Se-Min Lim** and Sang-Woo Jun, "MobileNets Can Be Lossily Compressed: Neural Network Compression for Embedded Accelerators," ***Electronics***, 2022.

[13] **Se-Min Lim**, Jooyoung Park, and Hyeong-Cheol Oh, "Low-Cost Method for Recognizing Table Tennis Activity," ***IEICE Transactions on Information and Systems***, 2019.

[14] **Se-Min Lim**, "AI-Based Coaching Assistant System for Sports Practice," ***Master's Thesis**, Korea University*, 2018.

[15] **Se-Min Lim**, Hyeong-Cheol Oh, Jaein Kim, Juwon Lee, and Jooyoung Park, "LSTM-Guided Coaching Assistant for Table Tennis Practice," ***Sensors***, 2018.

Patents

[1] Hyeong-Cheol Oh, **Se-Min Lim**, and Seongjin Choi, "Pipelined Squarer for Unsigned Integers of up to 16 Bits," *KR101974779*, filed Apr. 25, 2019.

Services

2025 **Reviewer** *Journal of Big Data*
2024 **External Review Committee** *USENIX ATC*
2022 **Reviewer** *IEEE Systems Journal*
2021 **Reviewer** *IEEE Systems Journal*

Teaching Experience

Kookmin University
Seoul, S.Korea

Assistant Professor
Sep. 2025 - Current

- Computer Architecture
- State-of-the-art Techniques for Computer Science
- C++ Programming

University of California, Irvine
Irvine, CA, U.S.A

Teaching Assistant
Sep. 2020 - Mar. 2025

- Principles of Operating System
- Computer Systems Architecture

Korea University
Seoul, S.Korea

Teaching Assistant
Mar. 2017 - Dec. 2018

- Computer Architecture, Digital System Laboratory
- Electronic Circuit II, Electric Circuits II, Signals and Systems I
- Introduction to Applied Mathematics, Discrete Mathematics
- Pre-Calculus, Calculus

Honors & Awards

2018 **Best Poster Award** *Korea Computer Congress (KCC)*
2016 **Best Research of Undergraduate Student Award** *Korea University*

Fellowships

University of California, Irvine
Fellowships of Graduate Student Researcher & Teaching Assistant
Sep. 2020 - Jun. 2025

Korea University
Fellowships of Graduate Research Assistant & Teaching Assistant
Mar. 2017 - Feb. 2019

Korea Student Aid Foundtaion
National Grant
Jun. 2015 - Dec. 2016

Korea University
Scholarship for Undergraduate Research Assistant
Sep. 2016

Korea University
Scholarship of Korea University Alumni Association
Dec. 2015

Skills

Programming Language Skills
- Bluespec, Verilog, VHDL, Bare-Meral
- C++, C, Python

- Linux, OpenCL, PyTorch, Keras, Tensorflow, CUDA, MATLAB, HTML

Software & Program Skills

- Xilinx Vivado, Xilinx Vitis, Intel Quartus Prime
- Kubernetes, Docker, Multisim
- Visual Studio, PyCharm, Jupyter, Spider

Languages

English

- Professional working proficiency

Korean

- Native proficiency