

# Young Jin Kim

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## Research Interests

Computer Architecture      Hardware Acceleration      Energy-Efficient System  
Near-Data Processing      Reconfigurable Architecture      VLSI Design

## Education

Aug 2025 **Bachelor in Electrical and Electronic Engineering, Yonsei University**, Seoul, South Korea  
GPA: 3.83/4.0, Major GPA: 3.92/4.0

## Research Experience

### Sep 2024 – Undergraduate Research Assistant

Present Yonsei University, Department of System Semiconductor Engineering

**Advisor:** Professor Jaeyong Chung

**Lab:** Hardware-AI Convergence (HAI) Laboratory

**Project: RISC-V Processor Development with Flexible Co-processor Integration**

- Designed RISC-V processor with custom ISA framework for senior undergraduate digital design curriculum
- Developed standardized interface protocol for seamless integration of accelerators with modular architecture
- Developing Chisel-based reconfigurable computing array for OpenGeMM acceleration

### Aug 2023 – Undergraduate Research Assistant

Aug 2024 Yonsei University, Department of Electrical and Electronic Engineering

**Advisor:** Professor Woo-Young Choi

**Lab:** High-Speed Circuits & System Laboratory

**Project: Photonic AI Accelerator using Silicon Micro Ring Modulator Weight Banks**

- Developed FPGA-based digital control systems for Silicon Micro Ring Modulators, leading core digital circuit implementation within research team
- Designed matrix-based algorithm to solve thermal crosstalk, improving control accuracy from 70% to 90% in neural network implementations on IRIS and MNIST datasets
- Designed PIC device models and AI training simulations using Python/MATLAB for system optimization

## Publications

### Oral Presentation

July 2024 **Kim, Y.-J., Ji, Y.-J., & Choi, W.-Y.** (2024, July). *A simple and efficient thermal crosstalk cancellation technique for photonic weight banks in optic neural networks*. Paper presented at the OSK Summer Annual Meeting, Optics and Photonics Congress 2024, ICC Jeju, Korea

### In Progress

2025 **Kim, Y.-J., & Chung, J.** *Dimension-Adaptive Reconfigurable Computing Array for Efficient GeMM Acceleration*

## Work Experience

### Sep 2024 – Intern, Samsung Memory Division, Hwaseong, Gyeonggi-do, South Korea

Present **Department:** Controller Development

**Team:** Signal Processing Task Group, Algorithm Part

**Advisor:** Hyunseung Han

**Project: AI Storage Solution: Near-Data Processing for SSD-Based Information Retrieval**

- Implemented FPGA-based IVF+PQ hardware IP with HLS (High-Level Synthesis), demonstrating potential for 20x acceleration compared to CPU-based solutions
- Modeled hardware accelerator for metadata filtering with prefetching mechanism and scheduling algorithm for multiple Graph IPs to process over one billion data points

## Teaching Experience

- Spring 2024 **Teaching Mentor, Introductory Digital Lab**, College of Engineering, Yonsei University
- Guided undergraduate students through FPGA fundamentals to AMBA and HDMI protocols
  - Assisted students in implementing game projects using Sprite movements and FSM on FPGA
- Spring 2022 **Peer Mentor, C++ Algorithm Study Group**, YCC (Yonsei Computer Club)
- Led weekly algorithm study sessions focusing on computational problem-solving and algorithm design
- Spring 2019 **Teaching Mentor, Engineering Chemistry I**, College of Engineering, Yonsei University
- Instructed undergraduate students on the comprehensive curriculum of Engineering Chemistry I
  - Outstanding Mentor Award from students, resulting in activity-based scholarship award

## Honors and Awards

### IPESK Next Generation Engineer Award

November 2024

Selected as a next-generation engineer by the Institute for Promotion of Engineering and Science of Korea

### Semiconductor Track Merit-Based & Academic Excellence Fellowship

Spring 2024, Fall 2023, Spring 2023 \$300 per semester

Spring 2023 - Fall 2024, \$300 monthly stipend for two years

Awarded by Samsung Display and LG Display

### Merit-based Scholarship

Coverage of one-third of tuition fees: Fall 2023, Fall 2022, Spring 2019

Coverage of two-third of tuition fees: Spring 2024

Awarded by Yonsei University

### Academic Honors

Spring 2019, Fall 2022

### GBED Activity-based Scholarship

Fall 2019, \$500

Awarded by Yonsei University

## Extracurricular Activities

Spring 2022 – **Club Group-Leader**, Mentors Club (Yonsei Exchange Students Club)

- Provided academic and social support to enhance exchange students' experiences
- Recognized as one of the club's top-performing members for exceptional student assistance

May 2022 – **Volunteer**, International Clinic, Yonsei Dawoom Hospital, Pyeongtaek, South Korea

- Assisted U.S. military families during medical visits, ensuring their comfort and understanding of the healthcare process
- Supported foreign children with settling in Korean society by addressing their challenges and providing Korean language lessons

Aug 2020 – **Firefighter**, Rescue and EMS Team, GongJu Fire Department, GongJu-Si, South Korea

- Served as a primary responder specializing in rescue operations and providing critical medical support
- Assumed a leadership role within the rescue team for six months responding to over 300 emergency calls

## Technical Skills

HW Design Verilog, Xilinx HLS, Synopsys Tools (DC, Verdi, Hspice), Virtuoso Cadence, Chisel(Learning)

Programming C/C++, Python, MATLAB

Miscellaneous Linux, Shell Script, L<sup>A</sup>T<sub>E</sub>X

## Languages

Korean Native

English Fluent (TOEFL: 102)

## Additional References

### **Professor Youngcheol Chae**

Department of Electrical and Electronic Engineering, Yonsei University  
**Email:** ychae@yonsei.ac.kr  
**Lab:** Yonsei Mixed-Signal IC Laboratory

### **Professor Tae Wook Kim**

Department of Electrical and Electronic Engineering, Yonsei University  
**Email:** taewook.kim@yonsei.ac.kr  
**Lab:** Circuits and Systems Design Lab

**Dr. Soonyoung Kang,** *Technical Leader*, Principal Engineer, Signal Processing TG, Algorithm Part  
Controller Development, Samsung Memory Division  
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**Additional references are available upon request**