

# Youngwoo Jeong

HARDWARE ENGINEER · ARCHITECTURE TEAM

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## Personal Profile

Hello! I'm Youngwoo (Ray) Jeong, and I received my master degree in Electronic Engineering at Seoul University of Science and Technology in February 2024. My research focused on computer architecture, security architecture, domain-specific accelerator, FPGA prototyping. Currently, I am working at MangoBoost, a DPU startup company, where I joined the architecture team in March 2024.

## Education

### Seoul National University of Science and Technology

Seoul, Repulic of Korea

MS in Electronic Engineering

Mar 2022 - Feb 2024

- Advisor: Prof. Seung Eun Lee
- Thesis: Approximate Arithmetic Circuits for Embedded Fuzzy Logic Controller
- Research Interest: Computer Architecture, Domain-specific Accelerator, Security Architecture, Energy-Efficient Computing, HW/SW Co-Design

### Seoul National University of Science and Technology

Seoul, Repulic of Korea

BS in Electronic and IT Media Engineering

Mar 2015 - Feb 2022

- Advisor: Prof. Seung Eun Lee

## Work Experience

### MangoBoost

Seoul, Repulic of Korea

Hardware Engineer

Mar 2024 - present

- Worked on an architecture team focused on efficiently offloading the NVMe/TCP protocol.
- Designed the NVMe Host Interface (NHI), which analyzes NVMe commands from the host, and the NVMe Host TCP Bridge (NHTB), which facilitates compatibility between NVMe and TCP.
- Designed the feature to ensure that NHI and NHTB function correctly when physical functions (PF) and virtual functions (VF) are dynamically configured on the host (referred to as multi-PF and multi-VF).
- Validated the system performance through Flexible I/O Tester (FIO) benchmarks, achieving a guaranteed maximum throughput of 200Gbps.

## Publications

### [CONFERENCE PROCEEDINGS]

#### [C8] The Design of Embedded Fuzzy Logic Controller for Autonomous Mobile Robots

Youngwoo Jeong, Won Sik Jeong, Jin Young Shin, Seung Eun Lee

International SoC Design Conference (ISOCC), Jeju, Korea, Oct., 2023, [URL]

#### [C7] Embedded Monitoring System for Preventing Lonely Death based on Edge AI

Soohee Kim, Jounghmin Park, Youngwoo Jeong, Seung Eun Lee

International Conference on Consumer Electronics (ICCE), Las Vegas, USA, Jan., 2023, [URL]

#### [C6] A Real-Time Reconfigurable AI Processor based on FPGA

Yue Ri Jeong, Kwonneung Cho, Youngwoo Jeong, Sun Beom Kwon, Seung Eun Lee

International Conference on Consumer Electronics (ICCE), Las Vegas, USA, Jan., 2023, [URL]

#### [C5] An Architecture for Resilient Federated Learning through Parallel Recognition

Jeongeun Kim, Youngwoo Jeong, Suyeon Jang, Seung Eun Lee

The 31st International Conference on Parallel Architectures and Compilation Techniques (PACT), Chicago, USA, Oct., 2022, [URL]

#### [C4] Robot-Specific Processor for Autonomous Driving

Youngwoo Jeong, Kwang Hyun Go, Soohee Kim, Seung Eun Lee

1st Workshop on Robotics Acceleration with Computing Hardware (RoboARCH) (Co-located with the IEEE/ACM International Symposium on Microarchitecture (MICRO)), Chicago, USA, Oct., 2022, [URL]

#### [C3] Intelligent Transportation System based on an Edge AI

Young Woo Jeong, Hyun Woo Oh, Su Yeon Jang, Seung Eun Lee

International Conference on Future Information & Communication Engineering (ICFICE), Jeju, Korea, Jan., 2022, [URL]

#### [C2] A Local Interconnect Network Controller for Resource-Constrained Automotive Devices

Kwonneung Cho, Hyun Woo Oh, Jeongeun Kim, Young Woo Jeong, Seung Eun Lee

International Conference on Consumer Electronics (ICCE), Online, Jan., 2022, [URL]

#### [C1] Robot-on-Chip: Computing on a Single Chip for an Autonomous Robot

Young Woo Jeong, Kwang Hyun Go, Seung Eun Lee

International Conference on Consumer Electronics (ICCE), Online, Jan., 2022, [URL]

[JOURNAL]

[J7] **SEAM: A synergetic energy-efficient approximate multiplier for application demanding substantial computational resources**  
**Youngwoo Jeong**, Jounghmin Park, Raehyeong Kim, Seung Eun Lee  
*Integration*. vol.101, 2025. [URL]

[J6] **Lightweight and Error-Tolerant Stereo Matching with a Stochastic Computing Processor**  
Seongmo An, Jongwon Oh, Sangho Lee, Jinyeol Kim, **Youngwoo Jeong**, Jeongeun Kim, Seung Eun Lee  
*Electronics*. vol.13, no.11, 2024. [URL]

[J5] **Accelerating Strawberry Ripeness Classification Using a Convolution-Based Feature Extractor along with an Edge AI Processor**  
Jounghmin Park, Jinyoung Shin, Raehyeong Kim, Seongmo An, Sangho Lee, Jinyeol Kim, Jongwon Oh, **Youngwoo Jeong**, Soohee Kim, Yue Ri Jeong, Seung Eun Lee  
*Electronics*. vol.13, no.2, 2024. [URL]

[J4] **Intelligent Monitoring System with Privacy Preservation Based on Edge AI**  
Soohee Kim, Jounghmin Park, **Youngwoo Jeong**, Seung Eun Lee  
*Micromachines*. vol.14, no.9, 2023. [URL]

[J3] **Parallel Stochastic Computing Architecture for Computationally Intensive Applications**  
Jeongeun Kim, Won Sik Jeong, **Youngwoo Jeong**, Seung Eun Lee  
*Electronics*. vol.12, no.7, 2023. [URL]

[J2] **Photoplethysmography-Based Distance Estimation for True Wireless Stereo**  
**Youngwoo Jeong**, Jounghmin Park, Sun Beom Kwon, Seung Eun Lee  
*Micromachines*. vol.14, no.2, 2023. [URL]

[J1] **An Edge AI Device Based Intelligent Transportation System**  
**Youngwoo Jeong**, Hyun Woo Oh, Soohee Kim, Seung Eun Lee  
*Journal of Information and Communication Convergence Engineering (JICCE)*. vol.20, no.3, 2022. [URL]

**Awards & Honors**

<b>Excellent Thesis Award</b> Seoul National University of Science and Technology • Topic: Approximate Arithmetic Circuits for Embedded Fuzzy Logic Controller	Seoul, South Korea February 2024
<b>Corporate (LX Semicon) Special Award</b> Korea Semiconductor Industry Association • Topic: AI Processor employing Stochastic Computing for Embedded Systems	Seoul, South Korea October 2022
<b>Department Chair Award</b> Seoul National University of Science and Technology • Topic: Design of an Autonomous Indoor Robot for Robot-on-Chip	Seoul, South Korea February 2022
<b>Corporate (Silicon Mitus) Special Award</b> Korea Semiconductor Industry Association • Topic: In-Vehicle Network Processor based on LIN and CAN-FD Controller	Seoul, South Korea November 2021

**Patents**

<b>Federated Learning Method and System Using Shared Learning Data</b> Seung Eun Lee, Jeongeun Kim, <b>Youngwoo Jeong</b> patent application	United States December 2023
<b>Method and System for Determining Final Result Using Federated Learning</b> Seung Eun Lee, Jeongeun Kim, <b>Youngwoo Jeong</b> patent application	United States December 2023

**Research Project**

<b>Development for Processing Software on AI Semiconductor Devices</b> Ministry of Science and ICT • Analyzed various AI models to standardize the input for AI systems. • Proposed an architecture for a hardware scheduler optimized for multi-AI core architecture.	South Korea 2024 - 2022
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## Development of Proximity/Healthcare Convergence Sensor SoC for TWS

South Korea

Ministry of Trade, Industry and Energy

2023 - 2021

- Designed a test environment for photoplethysmography sensors to evaluate their performance.
- Developed a waveform adjustment filter to enhance signal processing accuracy.
- Proposed an AI-based distance estimation algorithm for improved sensor accuracy.

## Embedded AI Module Based on Neuromorphic Computing

South Korea

Ministry of Trade, Industry and Energy

2021 - 2020

- Designed various applications utilizing multiple embedded AI modules.
- Developed a testbed for evaluating multi-AI core controllers.
- Proposed methodologies to enhance accuracy in federated learning with multi-AI core systems.

## Teaching Experience

### Advanced AI Processor

Seoul, South Korea

Seoul National University of Science and Technology

Fall 2022

Teaching Assistant

### Computer Architecture

Seoul, South Korea

Seoul National University of Science and Technology

Fall 2022

Teaching Assistant

### Digital System Design

Seoul, South Korea

Seoul National University of Science and Technology

Spring 2022

Teaching Assistant

### Resilient Processor Design

Seoul, South Korea

Seoul National University of Science and Technology

Spring 2022

Teaching Assistant

## Skills

### Hardware Description Languages

Verilog

### High-Level Computer Languages

SystemC, C, C++, Python, Matlab

### Design and Implementation Tools

Design Compiler, IC Compiler II, Quartus II, Vivado

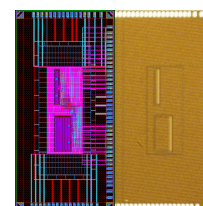
### Verification and Analysis Tools

VCS, Verdi, ModelSim, PSpice, PrimeTime, Formality, StarRC

## Chip Design

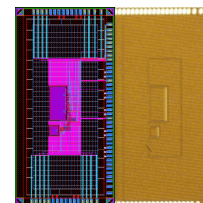
### Design of Robot-Specific Processor for Autonomous Driving

- Technology: Samsung 28nm RFCMOS
- Designer: **Youngwoo Jeong**, Yue Ri Jeong, Hyun Woo Oh, Kwang Hyun Go
- Gate Counts: 1062K @ 50MHz
- Memory: Code region (16KB), Data region (128KB)
- Date: 2022. 07. 18



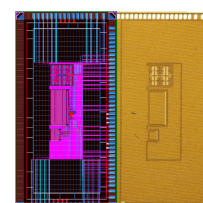
### A Vehicular Embedded Network Processor based on Cortex-M0

- Technology: Samsung 28nm RFCMOS
- Designer: Kwang Hyun Go, Soohee Kim, Kwonneung Cho, **Youngwoo Jeong**
- Gate Counts: 862K @ 50MHz
- Memory: Code region (16KB), Data region (128KB)
- Date: 2022. 07. 18



### Programmable Embedded AI Processor based on Cortex-M0

- Technology: Samsung 28nm RFCMOS
- Designer: Kwonneung Cho, **Youngwoo Jeong**, Hyun Woo Oh, Chang Yeop Han
- Gate Counts: 1238K @ 50MHz
- Memory: Code region (16KB), Data region (128KB), AI region (16KB)
- Date: 2021. 07. 19



References available upon request.