

Seojin Lee

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History

GyeongNam Science High School (Mar. 2019 ~ Feb. 2021)

High School Diploma - Early Graduation.

Korea Advanced Institute of Science and Technology (Mar. 2021 ~)

Candidate for Bachelor of Science in Electrical Engineering and Computer Science.

Key Coursework

Circuits & EE

EE201 Circuit Theory

EE202 Signals and Systems

EE210 Probability and Introductory Random Processes

EE211 Introduction of Physical Electronics

EE303 Digital System Design

EE304 Electronic Circuits

EE305 Introduction of Electronics Design Lab.

EE362 Semiconductor Devices

EE403 Analog Electronic Circuits

EE432 Digital Signal Processing

EE571 Advanced Electronic Circuits

Programming & Systems

EE209 Programming Structures for Electrical Engineering

CS220 Programming Principles

CS230 System Programming

CS311 Computer Organization

CS320 Programming Language

CS330 Operating System and Lab

CS341 Introduction to Computer Networks

CS Theory & AI

CS204 Discrete Mathematics

CS206 Data Structure

CS300 Introduction of Algorithms

CS306 Introduction to Database

CS376 Machine Learning

Republic of Korea Army (Jan. 2024 ~ July. 2025)

Sergeant - Honorably discharged upon completion of mandatory military service.

Research Interests

- Circuit & Hardware Systems:** Specialized in Analog Circuit Design and DAC architectures utilizing Cadence-OrCAD and Verilog for high-performance modeling.
- Software & Network Systems:** Expertise in Computer Networking and Security using C, Rust, and Python for high-performance systems, alongside Java and Scala.

Research Experience

Runtime-Adjustable Approximate Multiplier Research

KAIST, EPIC Lab. | Prof. Lee, Youngjoo | 2026.03 ~ Present

- Investigated the architectures of exact multipliers, implementing them at the Register-Transfer Level (RTL) to evaluate and compare their Power, Performance, and Area (PPA) metrics.
- Currently developing an advanced approximate multiplier architecture that dynamically adjusts the error rate at runtime, optimizing the trade-off between computation accuracy and hardware efficiency.

Analysis of DETR Model and Comparative Study of Backbone Performance

KAIST, Video and Image Computing Lab. | Prof. Kim, Mun-churl | 2025.06 ~ 2025.08

- Analyzed the core concepts and evolution of object detection by reviewing seminal papers including YOLO, Transformer, DETR, and Swin Transformer to understand their fundamental principles.
- Designed and executed a comparative experiment to address DETR's limitations, such as slow convergence, by establishing a deep learning server environment and replacing the standard ResNet-50 backbone with a Swin Transformer.
- Determined from initial loss analysis that the ResNet-50 backbone demonstrated superior performance in training speed, stability, and generalization, concluding that the Swin Transformer's local attention mechanism likely impairs the global context modeling fundamental to DETR.

8-bit 100MS/s full-binary Current Steering DAC

KAIST, Mixed Signal Integrated Circuits Lab. | Prof. Ryu, Seung-Tak | 2023.06 ~ 2023.08

- Investigated basic D/A Converter and Sampling Theory, focusing on the factors that increase the nonlinearity of Current-Steering DAC and studied how to reduce this effect in the circuit.
- Designed Current Cell and Switch Driver on TSMC-180nm in OrCAD, and validated performance through testbench simulation (60dB SFDR at Nyquist frequency).
- Improved performance by changing CMOS conditions for 2Gs/s clock frequency operation (58.3dB SFDR at Nyquist frequency).

Work Experience

Internship Program

Hankook Tire & Technology | Digital Intelligence Team | 2025.09 ~ 2026.02

- **Big Data Infrastructure & Standardization:** Developed "HKT Equipment Data Standardization Process" to manage and process approximately 1Trillion (4TB) raw data points extracted from PLC-IoT systems for factory automation.
- **Advanced Data Modeling:** Designed a diffusion-based upsampling model to overcome the limitations of 1-second sampling intervals, enabling precise production cycle and specification classification.
- **AI-driven Anomaly Detection:** Pre-processed raw sensor data and developed anomaly detection models using LSTM, CNN, and Autoencoders (AE) to enhance defect detection rates.
- **System Development:** Engineered a user permission level management system to ensure secure access control for remote equipment monitoring and operations.

Side Projects

Maeari — Scheduled Messaging Platform

MadCamp | Jul. 2026 | [Live](#) · [GitHub](#)

A deployed scheduled messaging platform for composing personal letters to oneself, friends, or non-members and delivering them at a chosen time through in-app inboxes, email, and SMS. The service combines Kakao authentication and phone verification, recipient-level delivery states, idempotent provider-aware retries, public claim and collection links, OCR-assisted multi-layer content moderation, and an AWS EC2–Nginx–PM2 deployment architecture.

Stack: Next.js · React · TypeScript · Express · PostgreSQL/Prisma · OpenAI Moderation · Tesseract.js · AWS EC2

CHIMap — Health-Aware Cross-Platform Transit Planner

MadCamp | Jul. 2026 | [GitHub](#)

A cross-platform transit planner for Web, iOS, and Android that turns the remaining steps toward a user's daily goal into three practical options: the fastest route, a route with roughly twice the walking, and the route closest to the target. The platform integrates Kakao and NAVER place and map services, TAGO transit data, Valhalla walking geometry, HealthKit/Health Connect, and React Native/Expo clients; its production Web/API covered 227K+ bus stops and 1,097 subway stations as of Aug. 2026, while the mobile clients were validated as staging release candidates.

Stack: React · React Native/Expo · TypeScript · Express · PostgreSQL/PostGIS · NAVER · Kakao · TAGO · Valhalla

ClickMe — Real-Time Social Voting Platform

MadCamp | Jul. 2026 | [GitHub](#)

A production campaign-based live voting platform that evolved from binary balance games into a 10-team KBO experience, recording 311K+ votes across six topics as of Aug. 2026. The service combines one-second polling, idempotent PostgreSQL vote transactions, 32-way sharded counters per choice, anonymous comments, shareable OG cards, privacy-minimized analytics, administrative controls, and a Cloudflare–Nginx–Next.js–Supabase deployment stack.

Stack: Next.js 16 · React 19 · TypeScript · Supabase/PostgreSQL · Nginx · Cloudflare

Leadership & Service

Teaching Assistant, KAIST CS101: Introduction to Programming

2023 Spring, 2023 Fall, 2026 Spring

- Conducted lab sessions for "Introduction to Programming," supporting freshman students in developing foundational programming skills.

Study Mentor, KAIST Science Outreach Program

Sep. 2023 - Dec. 2023

- Mentored high school students with a focus on science, providing sustainable academic support and career guidance.

Proctor, KAIST Freshman Advisor Group

Mar. 2023 ~ Dec. 2023

- Served as a proctor for the "Happy/Exciting College Life" course, facilitating freshmen's academic and social adaptation to campus.

Member, KAIST EE Student Council

Mar. 2022 - Dec. 2023

- Planned and executed over three major department-level festivals annually, fostering a vibrant campus culture and enhancing student engagement.
- Organized Career Concerts and Open Lab events with faculty and alumni to facilitate professional networking and career development for the student body.

Extracurricular Activities

- **Craftsman Bartender**, Human Resources Development Service of Korea | 2024 Winter.
- **Exchange Program**, Seoul National University | 2022 Winter.
- **Samsung Shining Star (1st Class)**, Samsung Electronics | 2022 Summer.