

# DONGHYUN YOUN

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## Summary

- **Proficient in 1) analog/mixed-signal IC design with 2) noise analysis, including**  
- Frequency-locked loop (FLL)   - SAR &  $\Delta\Sigma$  ADC   - 16-QAM modulator   - RTL-to-GDS design for SPI and I2C interfaces
- **Contributed to full-chip design and measurement with six successful tape-outs across diverse process nodes**  
- TSMC 180nm GP   - GF 130nm LP   - TSMC 65nm GP   - TSMC 55nm ULP   - Samsung 28nm LPP

## Skills

### EDA Tools

- **Cadence:** Spectre, AMS, Virtuoso, Allegro PCB Designer
- **Synopsys:** Design Compiler, IC Compiler, Prime Time, Formality, StarRC
- **Simens:** Calibre LVS, DRC, xRC

### Programming Language

- C/C++, MATLAB

### Hardware Description Language

- Verilog

## Education

### Korea Advanced Institute of Science and Technology (KAIST)

Daejeon, South Korea

- **Ph.D. Candidate** (Dissertation: Sensor-to-Digital Converter Interfaces Utilizing a Period Modulation) Mar. 2021 – Present
- **M.S.** (Thesis: An Energy-Efficient Driving Amplifier for Capsule Endoscopy System with Low Start-Up Energy) Mar. 2019 – Feb. 2021
- Graduate School of Electrical Engineering 🏢 (Advisor: [prof. Minkyu Je](#))

### Hanyang University

Seoul, South Korea

- **B.S. in Electronic Engineering** 🏢 (GPA: 4.13/4.5) Mar. 2013 – Feb. 2019

## Research Experience

[K] KAIST (Grad.) [H] Hanyang Univ. (Undergrad.) \* project leader

### On-Skin Sweat-Sensing Patch for Personalized Women's Healthcare [K]\*

Dec. 2024 – Present

- **Collaboration:** New York University, USA
- **Design Target:** Multi-channel sensor-to-digital converter for hormone monitoring

### Semi-Permanent Low-Latency Continuous Glucose Monitoring System for Diabetes [K]\*

Dec. 2020 – Dec. 2023

- **Collaboration:** Ulsan National Institute of Science and Technology (UNIST) and SB Solutions, South Korea
- **Design Target:** Low-power fast-conversion capacitance-to-digital converter (CDC) with 1mg/dL resolution
- **Development:** 1) 30pF-input sub-ms-sensing VCO-based CDC, 2) I2C interface (RTL-to-GDS), and 3) Systematic noise analysis

### RF Transceiver IC for Capsule Endoscopy [K]

Mar. 2019 – Feb. 2022

- **Collaboration:** Intramedic, South Korea
- **Design Target:** Low-power high-data-rate communication IC inside the capsule
- **Development:** 1) 16-QAM 435-MHz power amplifier with <20-ns startup and 2) SPI interface (custom-designed)

### Home Appliance Control System Based on Gesture Recognition [H]\*

Dec. 2017 – Dec. 2018

- **Advisor:** [Prof. Sung Ho Cho](#)
- **Development:** 1) MATLAB algorithm for gesture recognition and 2) its real-time demonstration with various gestures and places

### Signal Processing of High-Voltage Thin-Film-Transistor (TFT)-Based Tactile Sensor [H]

Sep. 2017 – Dec. 2017

- **Advisor:** [Prof. Seung-Beck Lee](#)
- **Development:** 1) MATLAB algorithm for real-time time-distance data of 3-axis accelerometer to calibrate TFT tactile sensor data

### Light Saber Model Utilizing MCU with 3-Axis Accelerometer, LED, and Audio Amplifier [H]

Mar. 2013 – Oct. 2013

- **Advisor:** [Prof. Whoi-Yul Kim](#)
- **Development:** 1) Hardware design combining sensors and actuators interacting with 2) C++ algorithm for gesture recognition

## Internship Experience & International Activities

### Memory Business, Samsung Electronics 🏢

Hwaseong, Gyeonggi, South Korea

- **Engineer Intern** (during Ph.D., M.S., and B.S. course)  
: Temperature sensor and data path design for Low-Latency Wide-IO (LLW) DRAM (Ph.D.) Jan. 2025 – Jan. 2025  
: Low-power area-efficient TRx driver design for High-bandwidth memory (HBM) (Ph.D.) Dec. 2022 – Jan. 2023  
: Data path design for electronic data processing (EDP) DRAM (M.S.) Aug. 2020 – Aug. 2020  
: Data path design for electronic data processing (EDP) DRAM (B.S.) Jul. 2018 – Aug. 2018

### 2025 IEEE International Solid-State Circuits Conference (ISSCC) 🏢

San Francisco, CA, USA

- **Volunteer at Bingo Networking Event** (Led by [Ben Keller](#) from NVIDIA, Program Organizer) Feb. 2025

### Qualcomm 🏢

San Diego, CA, USA

- **2018 IT Tour** (certificated by [Steve Mollenkopf](#), Chief Executive Officer) Jun. 2018 – Jul. 2018

### University of Washington 🏢

Seattle, WA, USA

- **2013 Short Term English Program** (certificated by [Cheryl Wheeler](#), Program Director) Jul. 2013 – Aug. 2013

## Leadership

### Lab Student Representative at IMPACT Lab, KAIST

Oct. 2021 – Aug. 2022

- Led 35+ Graduate Students in Electrical Engineering and 14+ Research Projects

### Academic Club Representative at BARAMI, Hanyang University

Dec. 2013 – Nov. 2014

- Led 20+ Undergraduate Students in Engineering and Their Research Demonstrations at an Annual Exhibition

## Honors and Awards

### Scholarships

- **Samsung Semiconductor Scholarship** (Full tuition & living expense) Sep. 2020 – Present
- **Government Scholarship** (Partial tuition) Mar. 2019 – Aug. 2020
- **Academic Excellence Scholarship** (Partial tuition) Sep. 2017 – Dec. 2018
- **Admission Scholarship** (Full tuition) Mar. 2013 – Dec. 2014

### Awards

- **Bronze Prize** issued by the 31st Samsung Humantech Paper Award Feb. 2025  
: A paper entitled "A PM-SAR Hybrid Capacitance-to-Digital Converter with pF-to-nF Input and  $\mu$ s-to-ms Sensing for Wide Application"
- **Best Paper Award (1<sup>st</sup> prize)** issued by the 31st Korean Conference on Semiconductors Sep. 2024  
: A paper entitled "Design Points of Period-Modulation Capacitance-to-Digital Converter for Continuous Glucose Monitoring System"
- **CDC Best Design Award (1<sup>st</sup> prize)** issued by the 31st Korean Conference on Semiconductors Jan. 2024  
: IC Development for Semi-Permanent Low-Latency Continuous Glucose Monitoring System
- **College of Engineering Dean's Award (3<sup>rd</sup> prize)** issued by Capstone Design Fair, Hanyang University Nov. 2018  
: Home Appliance Control System Based on Gesture Recognition
- **Academic Grand Prize (1<sup>st</sup> prize)** issued by Hanyang University May. 2018  
: 1<sup>st</sup>-place grade in fall semester, 2017
- **Excellence Award (3<sup>rd</sup> prize)** issued by Texas Instruments Innovation Challenge - Korean MCU Design Contest 2013 Nov. 2013  
: Light saber model utilizing MCU with 3-Axis accelerometer, LED, and audio amplifier



## Publication & Patent Granted

*\*co-first author*


### IEEE Conference

- **Donghyun Youn**, Kyeongwon Jeong, Woongro Youn, Hoyong Seong, Yechan Park, Sohmyung Ha, and Minkyu Je, "An 18.5nF-Input-Range PM-SAR Hybrid Capacitance-to-Digital Converter Achieving 6.1 $\mu$ s Conversion Time at 18.1pF Input Capacitance", *IEEE International Solid-State Circuits Conference (ISSCC)*, Feb. 2025 (**Accepted, (28.1) being on-site in San Francisco on Feb. 2025**) 
- Yechan Park, Phan Dang Hung, **Donghyun Youn**, Daehyeon Kwon, Chul Kim, and Minkyu Je, "An Enhanced-Frequency-Splitting-Based Wireless Power and Data Transfer System Achieving 60.2% End-to-End Efficiency and 1Mb/s Data Rate with a Sub-cm RX Coil for Miniaturized Implants," *IEEE International Solid-State Circuits Conference (ISSCC)*, Feb. 2025 (**Accepted**) 
- Hoyong Seong, **Donghyun Youn**, Injun Choi, Junghyup Lee, Sohmyung Ha, and Minkyu Je, "A 0.9V 2MHz 6.4x-Slope-Boosted Quadrature-Phase Relaxation Oscillator with 164.2dBc/Hz FoM and 62.5ppm Period Jitter in 0.18 $\mu$ m CMOS," *IEEE Custom Integrated Circuits Conference (CICC)*, Apr. 2023 
- Hoyong Seong, Chongsoo Jung, **Donghyun Youn**, Junghyup Lee, Sohmyung Ha, and Minkyu Je, "A 118.6fJ/Conversion-Step Two-Step Time-Domain RC-to-Digital Converter With 33nF/10M $\Omega$  Range and 53aFrms Resolution," *IEEE Asian Solid-State Circuits Conference (A-SSCC)*, Nov. 2022 
- **Donghyun Youn** and Minkyu Je, "A 67-pJ/bit 435-MHz 16-QAM Modulator for Capsule Endoscopy System with 18-ns Start-Up Using Transient DC Error Correction," *IEEE International Symposium on Circuits and Systems (ISCAS)*, May 2021 

### IEEE Journal

- **Donghyun Youn**\*, Youngin Kim\*, Injun Choi, Yoontae Jung, Hyuntak Jeon, Kyungtae Lee, Soon-Jae Kweon, Sohmyung Ha, and Minkyu Je, "A Wide-Dynamic-Range, DC-Coupled, Time-Based Neural-Recording IC with Optimized CCO Frequency", *IEEE Access*, vol. 12, pp. 94354–94366, Jul. 2024 
- Kyeongwon Jeong, Yoontae Jung, Gichan Yun, **Donghyun Youn**, Yehhyun Jo, Hyunjo Jenny Lee, Sohmyung Ha and Minkyu Je, "A PVT-Robust AFE-Embedded Error-Feedback Noise-Shaping SAR ADC with Chopper-Based Passive High-Pass IIR Filtering for Direct Neural Recording." *IEEE Transactions on Biomedical Circuits and Systems (TBioCAS)*, vol. 16, no. 4, pp 679–691, Jul. 2022 

### Patent Granted

- **Donghyun Youn**, Minkyu Je, Byungseok Lee, Geunhoe Kim, Ja-Hyuck Koo, Hungi Sim, "Precharge Method and Precharge Circuit Using the Same," *KR Patent* No. 10-2624192, Issued Jan. 2024 

## Personal References

### Minkyu Je, Associate Professor

- School of Electrical Engineering, KAIST

### Sohmyung Ha, Associate Professor

- Electrical Engineering and Bioengineering, NYU Abu Dhabi