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 & ΔΣM 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:** *Intromedic, 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 – Present
  : 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
  (B.S.) Jul. 2018 – Aug. 2018

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* Jan. 2025
  : *A paper entitled "A PM-SAR Hybrid Capacitance-to-Digital Converter with pF-to-nF Input and µs-to-ms Sensing for Wide Application"*
- **Best Paper Award (1st 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 (1st 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 (3rd prize)** *issued by Capstone Design Fair, Hanyang University* Nov. 2018
  : *Home Appliance Control System Based on Gesture Recognition*
- **Academic Grand Prize (1st prize)** *issued by Hanyang University* May. 2018
  : *1st-place grade in fall semester, 2017*
- **Excellence Award (3rd 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 6.1µs Conversion Time at 18.1pF Input Capacitance", *IEEE International Solid-State Circuits Conference (**ISSCC**)*, Feb. 2025 ***(Accepted, being on-site in San Francisco on Feb. 2025)*** ***(28.1)***
- 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)*** ***(35.6)***
- 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 0.18µm 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/10MΩ 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, Hyunjoo 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*