

**Chanseung Lee**

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## • Education

[Kyung Hee University](#), Republic of Korea

- B.S. in Applied Physics & Electronic Engineering 2023 – 2027 (expected)

## • Research Interests

Developing semiconductor-based photonic integrated circuits for next-generation quantum computers.

- Silicon Photonics: Towards integrated optical computers with strain-engineered on-chip lasers
- Quantum Photonics: Towards integrated quantum processors with strain-engineered 2D quantum devices

## • Research Experience

[Q-SPIN Laboratory](#) (Quantum semiconductor Photonic Integrated Lab), [KAIST](#)

Advisor: Professor **Donguk Nam**

Research Intern, Dec 2025 – Feb 2026

- Modeling strain-engineered optical & quantum behavior
- Exploring integration strategies for on-chip optical quantum computing

## • Projects

[1] Characterization and Parameter Extraction of Long- and Short-Channel MOSFETs (2025) [\[pdf\]](#)

Measured I–V characteristics using MS TECH probe station and CLARIUS software

Extracted  $V_t$  (ext/lin/sat), SS,  $I_{off}$ , GIDL, DIBL, and  $g_m$

Analyzed long-channel vs short-channel behaviors and body-bias effects

Compared device scaling effects based on  $L = 10\ \mu\text{m}$  and  $L = 0.35\ \mu\text{m}$  transistors

[2] TCAD CMOS Process Simulation (2025) [\[pdf\]](#)

Built complete nMOS fabrication flow: oxidation → implantation → annealing → metallization

Extracted electrical characteristics ( $I_D$ – $V_G/V_D$ ,  $V_{th}$ ,  $g_m$ ,  $r_o$ )

Explored short-channel non-idealities such as DIBL and GIDL.

Explored high-k oxide effects

[3] Designing Multistage Analog Amplifier Using LTspice (2025) [pdf]

Designed differential → gain → output stages

Performed AC/DC/transient analysis and pole-zero estimation

Optimized gain, bandwidth, and power consumption

[4] Single Photon Verification and Photon Statistics Analysis Using HBT, SPDC, and GRA Experiments (2025) [pdf]

Measured normalized second-order correlation function  $g^2(0)$  using HBT and GRA setups

Compared photon statistics of coherent, thermal, and SPDC-generated single-photon sources

Implemented SPDC photon pair generation using BBO crystal and verified photon-pair correlations

Demonstrated single-photon behavior through coincidence suppression ( $g^2(0) \rightarrow 0$ )

Analyzed effects of detector alignment, filtering, and classical vs quantum light sources

## • Skills

### - Simulation & Modeling

Silvaco TCAD (ATHENA, ATLAS)

LTspice (analog integrated circuit design)

### - Programming

Python

### - Device & Fabrication Knowledge

Semiconductor processes (CVD, PVD, ALD, plasma etching, lithography, wafer bonding, MEMS)

MOSFET/TFT/ LCD & OLED physics