

Chanseung Lee

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Seeking PhD opportunities in the U.S. for Fall 2027

EDUCATION

Kyung Hee University, Republic of Korea

2023.03 – 2027.02 (expected)

Bachelor of Science – Applied Physics / Bachelor of Engineering – Electronic Engineering

- GPA: 4.03/4.50 (Percentage equivalent: 95.1/100)
- Advisor: Prof. Donguk Nam (SNU, research intern), Prof. Seunghwan Lee (KHU, graduation research)
- Relevant Coursework: Semiconductor Engineering, Semiconductor Fabrication, Physical Electronics, Fourier Optics, Electromagnetism, Quantum Mechanics, Experiments for Quantum Information

RESEARCH INTERESTS

Integrated photonics for optical interconnects and quantum technologies, with emphasis on low-loss, high-speed devices for co-packaged optics (CPO) and nonlinear optical processes for frequency conversion and quantum light generation.

RESEARCH EXPERIENCE

On-Chip Quantum Frequency Conversion in LN-on-SiN Waveguides

Seoul National University (SNU), Q-SPIN Lab, Republic of Korea

2026.05 – Present

Collaboration with Samsung Advanced Institute of Technology (SAIT)

- Designed an LN-on-SiN platform integrating directly bonded z-cut thin-film lithium niobate and laterally split-poled domains for efficient quantum frequency conversion via modal phase matching.
- Performed eigenmode and overlap-integral simulations (Ansys Lumerical MODE / FDE) to optimize phase-matched conversion, achieving a simulated normalized conversion efficiency of 350 %/W/cm².
- Preparing SiN waveguide fabrication and LNOI bonding at SNU ISRC FAB, including a LIGENTEC SiN foundry chip tape-out.

Micro-Ring Resonator Photon-Pair Sources Based on SFWM

KAIST, Q-SPIN Lab, Republic of Korea

2025.12 – 2026.05

- Studied silicon nitride microring resonators for high-purity photon-pair generation via spontaneous four-wave mixing (SFWM), targeting integrated quantum photonic circuits.
- Studied ring–bus coupling regimes and MZI, AMZI, and RMZI structures for integrated photonic circuits.
- Reviewed literature on high-purity SFWM photon-pair sources for discrete-variable photonic quantum computing.

Photonic Integrated Circuit Design and Foundry Tape-Out [\[Chip Layout\]](#)

KAIST, Q-SPIN Lab, Republic of Korea

2025.12 – 2026.02

- Contributed SiN microring designs for SFWM photon-pair sources to a LIGENTEC MPW tape-out.
- Performed coupling-gap sweeps to evaluate bus–ring coupling for the foundry design.
- Determined the critical-coupling condition by matching bus–ring power coupling to round-trip internal loss estimated from LIGENTEC-provided propagation loss.

High-k HfO₂/Al₂O₃ Gate-Stack FinFET Simulation for Space Applications

Undergraduate Graduation Research, KHU, Republic of Korea

2026.09 – Present

- Investigating HfO₂/Al₂O₃ gate-stack FinFETs using Sentaurus TCAD and Sentaurus Device.
- Planning total ionizing dose (TID) simulations over 100–800 krad(Si) to evaluate threshold-voltage shifts and leakage current.
- Planning comparisons of SS, DIBL, and Ion/Ioff across gate-stack compositions to assess radiation tolerance.

PATENT

- [1] D. Nam, D. Zhang, **C. Lee**, and T. Kim, "Laterally split-poled thin-film lithium niobate waveguide devices with modal phase matching and methods of fabricating the same", in preparation.

ACADEMIC PROJECTS

Single-Photon Verification, Photon-Statistics Analysis Using HBT and GRA Experiments (A+) [\[pdf\]](#)

(prof. Gwang Jo Lee)

2025

- Performed optical alignment of HBT and GRA setups and measured $g^{(2)}(0)$ to characterize the photon statistics of coherent, thermal, and SPDC-based light sources.
- Generated photon pairs via SPDC with a BBO crystal and verified nonclassical single-photon behavior through coincidence suppression.

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

(prof. Seung Hwan Lee)

2025

- Measured transistor I–V characteristics using an MS TECH probe station and CLARIUS software, and extracted key parameters including V_t , SS, I_{off} , GIDL, DIBL, and g_m .
- Analyzed long- and short-channel device behavior, body-bias effects, and transistor scaling by comparing $L = 10\ \mu\text{m}$ and $L = 0.35\ \mu\text{m}$ devices.

Device and Process Simulation of CMOS Transistors Using Silvaco TCAD (Pass) [\[pdf\]](#)

(prof. Seung Hyun Lee)

2025

- Built a complete NMOS fabrication flow including oxidation, implantation, annealing, and metallization, and extracted key electrical characteristics such as I_D – V_G/V_D , V_{th} , g_m , and r_o .
- Investigated short-channel non-idealities including DIBL, GIDL, and the effects of high-k gate oxides.

Design of a Multistage Analog Amplifier Using LTspice (A+) [\[pdf\]](#)

(prof. Young Hyun Lim)

2025

- Designed differential, gain, and output stages, and performed AC/DC/transient analysis with pole-zero estimation.
- Optimized amplifier performance in terms of gain, bandwidth, and power consumption.

TEACHING EXPERIENCE

Instructor, Keystone Edu Academy, Suwon, Republic of Korea

2025.03 – 2025.09

- Taught middle school and high school mathematics for school internal examinations.

Mentor, Kyung Hee University, Republic of Korea

2025.02 – 2025.06

- Taught calculus and basic circuit analysis to freshman and sophomore students through MARO, an Electronic Engineering academic society.

Instructor, Cheongchulearam Academy, Seoul, Republic of Korea

2023.03 – 2025.02

- Provided one-on-one instruction in mathematics for the Korean College Scholastic Ability Test (CSAT), covering calculus, geometry, and related topics.
- Improved students' CSAT mathematics performance from the 4th grade level (approximately top 40%) to the 2nd (top 11%) and 1st (top 4%) grade levels.

ACTIVITIES

- Developed graduate-level ring resonator lecture materials for SNU ECE (2026)
- Attended the 2025 Quantum Information Winter School hosted by KPS and QISK. (2025)

ADDITIONAL INFORMATION

- Simulation Tools: Ansys Lumerical (FDTD, FDE, MODE), Silvaco TCAD, Sentaurus TCAD, LTspice.
- Fabrication and characterization: Thermal Evaporator, E-beam Evaporator, Ellipsometer, Probe station
- Hobbies: swimming, café, running, basketball.