Sean Kim

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EDUCATION

Purdue University — **West Lafayette, USA**
Ph.D. in Mechanical Engineering — Aug. 2025 – Present

Texas A&M University, College Station (TAMU) — **College Station, USA**
MSc in Mechanical Engineering — Aug. 2023 – May. 2025
- GPA: 4.00/4.00

Seoul National University of Science and Technology (SeoulTech) — **Seoul, Korea**
BSc in Manufacturing Systems and Design Engineering (MSDE) — Mar. 2017 – Feb. 2023
- GPA: 4.26/4.50 (3.9/4.0), *Summa Cum Laude*, Rank: 1/33

Northumbria University — **Newcastle, UK**
BEng in MSDE (dual degree) — Mar. 2020 – May. 2023
- GPA: 3.97/4.00, First Class Hons.

RESEARCH INTERESTS

Energy Storage System, Micro- and Nanoscale Engineering, Interface Analysis, Quantitative Measurement, Inspection and Metrology, Electrochemical Impedance Spectroscopy (EIS), Machine Learning

RESEARCH EXPERIENCE

PMI Lab, TAMU
Graduate Research Assistant (Advisor: Prof. Chabum Lee) — Aug. 2023 – May. 2025
Electrochemical Impedance Spectroscopy (EIS) Analysis
- Analyzed the properties, quality, and characteristics of interfaces of bonded wafer using non-destructive EIS analysis employing magnetic probe with ball-to-flat configuration.
- Characterized die-/wafer-to-wafer bonding strength by analyzing Nyquist diagram to identify defect modes and developed equivalent circuit models for SiO_2 and SiCN.
- Validated defect modes by correlating IR imaging, EIS, and destructive bonding strength measurement.
- Classified defect modes of bonded wafers using AI algorithm by analyzing capacitance, resistance, and frequency from Nyquist diagram.

Yoon Lab, Seoultech
Undergraduate Research Assistant (Advisor: Prof. Gwanho Yoon) — Sept. 2021 – Dec. 2022
Development of Optical Simulator
- Developed a fully connected deep neural network using Keras to predict optical responses (reflectance, transmittance, and absorption) and inversely design the structure of multilayered thin films.
- Designed, modeled, and developed a user interface for the scattering matrix method to summarize the electromagnetic properties of the multilayered thin films using Python: PyQt.
- Verified the transmittance of fabricated thin films using UV/Vis spectrophotometer and COMSOL.
- Optimized deep neural networks to minimize MSE through functional variations (e.g., model architecture, dataset size).

Electronics Convergence Lab, Seoultech
Undergraduate Research Assistant (Advisor: Prof. Dongyoung Jang) — Nov. 2020 – Jun. 2021
Autonomous Mobile Robot
- Developed obstacle passing algorithm for a mobile robot using Follow the Gap Method (FGM) that suggests the closest gap to the optimal path, reducing the lap time by 7.2%.
- Iteratively tested and optimized FGM threshold and PID gain to achieve the fastest lap time and optimal obstacle avoidance with simulation based on Rviz, Rospy.

PUBLICATION

C. Kim, I. Lee, and G. Yoon, "Studies on General Deep Neural Networks to Predict Optical Responses of Multilayered Thin Films," *J. of Flex. and Print. Electron*. 2022;1(1):101-110. (DOI: 10.56767/jfpe.2022.1.1.101)

I. Lee, **C. Kim**, K. Ju, G. Jun, and G. Yoon, "Implementation of particle swarm optimization for complete inverse design of multilayered optical filters," *Appl Opt.* 2023 Dec 1;62(34):8994-9001. (DOI: 10.1364/AO.500775)

CONFERENCE

I. Lee (poster presenter), **C. Kim**, and G. Yoon et al., "Implementation of Inverse Design for Optical Multi-layer Thin Films", *International Meeting on Information Display 2022* Aug. 2022

PROJECT EXPERIENCE

I-Corps Site Program, TAMU Sept. 2023 – Nov. 2023

- Developed high-throughput wafer edge metrology and inspection technology using waveguide-based darkfield microscopy system.

Focused Ion-beam (FIB) Milling System Software Development Mar. 2022 – Dec.2022

- Developed microfabrication trajectory planning algorithm for FIB milling system using Python: fib-o-mat.
- Designed an algorithm to convert pattern coordinates into text file format for trajectory modeling.

WORK EXPERIENCE

Graduate Teaching Assistant, TAMU Jan. 2024 – May. 2025

- MEEN360: Materials & Manufacturing Selection in Design (Instructor: Prof. Aravind Krishnamoorthy)
- MEEN368: Solid Mechanics in Mechanical Design (Instructor: Prof. Justin W. Wilkerson)

Teaching Assistant, SeoulTech Mar. 2022 – Jun. 2022

- MSDE223: Computer Programming (Instructor: Prof. Gwanho Yoon)

AWARDS/HONORS

Emil Buehler Aerodynamic Analog Fellowship, TAMU **($2K)** Aug. 2023– Dec. 2024
Samsung Austin Semiconductor Fellowship, Samsung Austin **($25K)** Jan. 2024 – Dec. 2024
President's Award of outstanding academic excellence scholarship for five semesters, Seoultech **($16.5K)** Sept. 2017 – Feb. 2023
Dean's Award of outstanding academic excellence scholarship for seven consecutive semesters, Seoultech **($10K)** Sept. 2017 – Feb. 2023
Second place in the Capstone design project competition, Seoultech Jun. 2022
Korea's M. N. D Foundation Scholarship ($2K) Jun. 2021 – Jun. 2022

TECHNICAL SKILLS

Programming Python, C, C++, MATLAB
Software ANSYS Workbench, COMSOL, SOLIDWORKS, LABVIEW, AutoCAD

EXTRACURRICULAR ACTIVITIES

BBB Korea Feb. 2021 – Present

- Provided English interpretation for foreign visitors to Korea.

Korean Aggies Tennis Club & Korean Aggies Student Association Jan. 2024 – Dec. 2024

- Served as president of the tennis club & student association, organized orientation and intramural events.

MEMS Fabrication Process Training at Seoul National University Sept. 2022 – Oct. 2022

- Examined and practiced the entire MEMS fabrication process for MOSCAP fabrication.