Hansol Lee

Email: hansol.lee@gatech.edu | **Website:** hansollee-git.github.io | **Linkdein:** linkedin.com/in/hansollee-research

RESEARCH INTERESTS

Electro-thermal co-design and co-optimization of 2.5D/3D heterogeneous integration / Thermal & signal & power integrity of advanced packaging / Glass-core packaging

EDUCATION

Georgia Institute of Technology Aug. 2025 - Present
Ph.D. Electrical and Computer Engineering *Advisor: Prof. Muhannad Bakir*

Korea Advanced Institute of Science and Technology (KAIST) Mar. 2022 – Feb. 2024
M.S. Mechanical Engineering | ***GPA**: 4.26/4.3* *Advisor: Prof. Sung Jin Kim*

Korea Advanced Institute of Science and Technology (KAIST) Mar. 2015 – Feb. 2022
B.S. Mechanical Engineering | ***GPA**: 3.81/4.3* *Advisor: Prof. Wang-Yuhl Oh*

AWARDS & HONORS

Outstanding Master's Research Award (Top 3 Graduates in the ME department) Nov. 2024
Department of Mechanical Engineering at KAIST

Outstanding Achievement Award (Top 5% students in the ME department) Mar. 2021
Department of Mechanical Engineering in KAIST

Scientific Writing Competition - *Encouragement Award* Mar. 2021
KAIST

National Science & Technology Scholarship Mar. 2015 – Aug. 2021
Korea Student Aid Foundation (KOSAF)

RESEARCH EXPERIENCE

Integrated 3D Systems Group | Georgia Tech Aug. 2026 – Present
Graduate Research Assistant (Advisor: Prof. Muhannad Bakir)

- **Thermal management of glass-core packaging with core-embedded chiplets**: Developing thermal management strategies for glass-core packaging with core-embedded chiplets using advanced material (e.g. diamond and AlN) and thermal-aware redistribution layer (RDL) and through via designs.
- **Electro-thermal co-design of inter-tier microfluidic cooling for 2.5D & 3D ICs**: Developing inter-tier microfluidic cooling architecture with thorugh-silicon-vias (TSVs), considering vertical interconnections and thermal management of 2.5D and 3D ICs.

Applied Heat Transfer Lab | KAIST Jan. 2021 – Feb. 2026
Research Intern & Graduate Research Assistant (Advisor: Prof. Sung Jin Kim)

- **Thermal-hydraulic modeling of manifold microchannel (MMC) heat sinks**: Developed an analytical thermal-hydraulic model of MMC heat sinks for embedded cooling in ultra-high heat flux($>1\text{kW/cm}^2$) electronics. [Publication and presentations based on this work: (J1), (C1)-(C2)]
- **Multi-objective performance optimization of MMCs**: Performed multi-objective optimization of MMCs, achieving record-high thermal performance with uniform flow distribution through multi-fidelity surrogate modeling. [Publication based on this work: (J2)]
- **Thermal reliability verification of 2.5D/3D Processing-In-Memory (PIM) heterogeneous packages**: Developed a compact thermal model for 2.5D/3D PIM heterogeneous packages, reducing the computational cost by 98%. Invented TSV embedded manifold microchannels. [Patent based on this work: (P1)]
- **Hands-on experience in IR thermometry and pool boiling heat transfer analysis**: Led a project on the analysis of phase change heat transfer during pool boiling using IR thermometry and numerical analysis techniques.

Thermal Radiation Laboratory | KAIST Dec. 2017 – Feb. 2018
Undergraduate Research Assistant (Advisor: Prof. Bong Jae Lee)

- Explored and applied machine learning techniques to efficiently solve complex inverse heat conduction problems.

JOURNAL PUBLICATIONS

(J1) **H. Lee***, Y. J. Lee*, S. J. Kim, One-dimensional model of manifold microchannel heat sinks: Prediction of thermal performance and flow non-uniformity, *International Communications in Heat and Mass Transfer.* (2022 JCR: 4.7%, IF: 7.0) [Link]

(J2) Y. J. Lee*, **H. Lee***, C. Hwang*, I. Lee, S. J. Kim, Highly energy-efficient manifold microchannel for cooling electronics with coefficient of performance over 100,000. *(Under review)*

*First co-author

PATENTS

(P1) Embedded manifold microchannel heat sink utilizing through silicon via (TSV) for electrical communication as a heat dissipation structure in a 2.5D/3D packages, Y. J. Lee, **H. Lee**, S. J. Kim (South Korea, Application No.P2024-0824-KR01)

CONFERENCES

(C1) **H. Lee**, Y. J. Lee, S. J. Kim, One-dimensional modeling of embedded manifold microchannels with plate fins for prediction of thermal performance and flow non-uniformity, ***Korean Society Mechanical Engineering Thermal Engineering Division* (2024 KSME-TED)**, Apr. 2024, Jeju, Republic of Korea

(C2) **H. Lee**, S. J. Kim, Thermal performance prediction of liquid-cooled manifold microchannel (MMC) heat sinks with plate fins, ***Korean Society Mechanical Engineering Thermal Engineering Division* (2023 KSME-TED)**, Apr. 2023, Gyeongju, Republic of Korea

(C3) A. Victor, D. Go, **H. Lee**, A. C. Kummel, M. S. Bakir, AlN-based Chiplet Encapsulation: Enhancing Thermal Performance for High-density Heterogeneous Integration, ***The 2026 IEEE 76th Electronic Components and Technology Conference (ECTC2026).*** *(Abstract accepted)*

PROJECTS

National Advanced Packaging Manufacturing Program (NAPMP) Dec. 2025 – Present
National Institute of Standards and Technology (NIST) *PI: Prof. Muhannad Bakir*

- Developing package-level thermal management solutions for glass-core packages with core-embedded chiplets by evaluating diamond/AlN heat spreaders and interface stacks, and co-optimizing thermal-aware RDL and through-via layouts to reduce hotspots and improve thermal reliability under chiplet power maps.

3D Multiporous Cooling System for Ultra-high Heat Flux Applications Mar. 2022 – Feb. 2024
National Research Foundation of Korea (NRF) *PI: Prof. Sung Jin Kim*

- Conducted an analytical thermal-hydraulic modeling of 3D structured monoporous coolers with various types of manifold. Optimized its performance and contributed to the development of cooling solutions for ultra-high heat flux electronics.

Thermal Reliability Verification of 2.5D/3D PIM Heterogeneous Package Mar 2023 – Feb. 2024
Electronics and Telecommunications Research Institute (ETRI) *PI: Prof. Sung Jin Kim*

- Developed a compact thermal model of a PIM heterogeneous package to verify thermal reliability. Invented the embedded manifold microchannels utilizing through-silicon vias (TSV) for both electrical communication and heat dissipation. (see patent above)

PROFESSIONAL EXPERIENCE

Thermal/Research Engineer July. 2024 – Dec. 2024
Koolmicro Inc. *Hwaseong, Republic of Korea*

- Optimized the thermal performance of a liquid cooling module for large-die-size ($>$ 2cm $\times$ 2cm) chiplets, specifically for data centers and high performance computing (HPC) systems. Designed a thermal test section for evaluating the thermal performance of the liquid cooling module.

Research Intern Jun. 2018 – Feb. 2019
Beflex Inc. *Daejeon, Republic of Korea*

- Developed algorithms in biomechanical running trackers for measuring ground impact and GPS paths of runners. Conducted a user experience study for earphone-type running trackers.

EXTRACURRICULAR ACTIVITIES

Student Press - Editor in ME Newsletter Apr. 2022 – May. 2023

Department of Mechanical Engineering in KAIST

- Drafted, edited, and published articles introducing monthly research highlights in the ME department. Interviewed professors and researchers in the ME department.

Vice President of KAIST Entrepreneurs Mar. 2018. – Feb. 2019

KAIST K-School

- Developed a student-oriented social network connecting student startup teams via KE party. Interviewed and published articles introducing alumni entrepreneurs.

TEACHING

Physics tutoring for Gifted Education Sep. 2021 – Feb. 2022

KAIST Center for Gifted Education

- Taught physics to gifted middle school students and conducted regular mentoring sessions.

International Freshman Tutoring - General Physics I Mar. 2021 – Jun. 2021

KAIST

- Tutored international freshmen in general physics in English.

SKILLS

Programming languages: MATLAB, Python, C
Commercial software: ANSYS Fluent, Icepack, SpaceClaim, Inventor, AutoCAD, Illustrator
English proficiency: TOEFL 108 (R/L/S/W - 30/26/24/28)

MILITARY SERVICE

Capital Artillery Brigade March. 2019 – Oct. 2020

Army Sergeant, Honorable Discharge, Administration Specialist *Gimpo, Republic of Korea*