Subin Choi

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Education

Hongik University, MS in Mechanical Engineering — Mar 2024 – Feb 2026

- GPA: 3.92/4.0

Hongik University, BS in Mechanical Engineering — Mar 2018 – Feb 2024

- GPA: total 3.65/4.0 upper division 3.75/4.0 major 3.64/4.0
- **Coursework:** Mechanical Computer Aided Engineering, Applied Computational Mechanics, Heat Transfer, Thermal Dynamics, Fluid Dynamics

Publications

Numerical Modeling of n-Hexane pyrolysis with an Optimized Kinetic Mechanism in a Hydrogen Plasma Reactor — arxiv.org/abs/2506.13789

Research Project

Development of Novel Plasma Process for Hydrocarbon Cracking, Research Assistant — Mar 2024 – Feb 2026

- Numerical modeling of the pyrolysis process of n-hexane in a hydrogen plasma reactor with an optimized kinetic mechanism.
- Analyzed the influence of temperature, residence time, and feed composition on product yield and selectivity.
- Automated data processing and visualization using Python for comparative analysis.
- Presented research findings at international conferences based on study results.
- Research outcomes published in the *International Journal of Hydrogen Energy*.
- Contributed to a journal article published in the *International Journal of Hydrogen Energy*.

Development and Integration of Platform for Organic Waste Conversion Processes, Research Assistant — Mar 2024 – Feb 2026

- Developed numerical models for pyrolysis of waste plastic-derived oil in a hydrogen plasma reactor using Reaction Mechanism Generator (RMG).
- Constructed and validated detailed chemical kinetic mechanisms for complex hydrocarbon mixtures.
- Presented findings at international conferences based on study results.
- Research outcomes published in the *International Journal of Hydrogen Energy*.

Design of Computer Air Vent Using Flow Analysis Inside the Computer Body, Team Member — Mar 2023 – Dec 2023

- Performed CFD simulations to analyze airflow and thermal distribution within a computer case.
- Optimized the placement of inlets and outlets to enhance cooling efficiency.
- Predicted up to 400% improvement in heat dissipation compared to baseline design.

Future Autonomous Vehicle Driving Competition, Team Member — Dec 2022 – Feb 2023

- Implemented autonomous driving algorithms using ROS, LiDAR, and camera-based perception.
- Developed obstacle detection, lane recognition, and path planning modules.
- Optimized control algorithms for stable navigation in real test environments.
- Achieved 4th place in the national competition.

Development of an Eco-Friendly Solar Heater System Using a Fresnel Lens and Paraffin, Team Member — Mar 2022 – Dec 2023

- Designed and built a solar heating prototype using Fresnel lens concentration and paraffin-based PCM (Phase Change Material) for heat storage.

- Conducted thermal analysis and experimental validation of heat storage/discharge efficiency.
- Modeled system performance using CAD and ANSYS tools to optimize thermal behavior.
- Project recognized in university Capstone Design Competition with award placement.

Experience

Research Assistant, Korea Institute of Machinery and Materials Mar 2024 – Feb 2026

- Investigated plasma-assisted hydrocarbon cracking for hydrogen production.
- Conducted CFD simulations and kinetic modeling to analyze thermal-fluid and chemical behavior in plasma reactors.
- Validated simulation models with experimental data to improve accuracy.
- Drafted manuscripts and co-prepared presentations for international conferences.

Undergraduate Research Assistant, Hongik University Mar 2023 – Feb 2024

- Assisted in numerical and experimental studies of plasma pyrolysis for hydrocarbon conversion.
- Automated data preprocessing, visualization, and analysis using Python.
- Supported preparation of research manuscripts and lab seminars.

Undergraduate Research Opportunity Program (UROP), Hongik University, Team Member Sep 2022 – Feb 2023

- Participated in a structured undergraduate research training program.
- Conducted experiments, collected data, and supported project documentation.
- Gained early exposure to research methodology and academic writing.

Conference

The 10th East Asia Joint Symposium on Plasma and Electrostatic Technologies for Environmental Application (EAPETEA-10), Oral Presentation, Dec 2025
Numerical Modeling of the Pyrolysis Process of Waste Plastic-Derived Oil in a Hydrogen Plasma Reactor Using Reaction Mechanism Generator (RMG)

The 26th International Symposium on Plasma Chemistry (ISPC26), Oral Presentation, Jun 2025
Numerical Modeling of n-Hexane Hydropyrolysis with an Optimized Kinetic Mechanism in a Rotating Gliding Arc Reactor

The Korean Society of Mechanical Engineers (KSME) Thermal Engineering Division 2025 Spring Conference, Oral Presentation, Apr 2025
Numerical Simulation of n-Hexane Pyrolysis in a Rotating Gliding Arc Reactor

The 13th International Symposium on Non-thermal/Thermal Plasma for Pollution Control & Sustainable Energy, Oral Presentation, Nov 2024
Numerical Study of Plasma Pyrolysis of n-Hexane in a Rotating Gliding Arc Reactor

Honors & Scholarships

Awarded Academic Excellence Scholarship, Hongik University Autumn 2023

Awarded Academic Excellence Scholarship, Hongik University Spring 2023

Peer Tutoring Scholarship, Hongik University 2022 – 2023
Tutored underperforming students across 4 semesters as part of an academic support scholarship program.

Subject Tutoring Scholarship, Hongik University 2022 – 2023
Selected as course tutor in Physics, Chemistry, and Fluid Mechanics.

Math Tutoring Volunteer Scholarship, Hongik University Autumn 2022
Provided volunteer peer tutoring in mathematics; recognized with a service-based scholarship.

Awards

4th Place – Mechanical Engineering AI/DX Idea Competition 2024
"Numerical Solutions to Heat Transfer Problems Using Generative AI and Python."

3rd Place – University Comprehensive Design Competition, Hongik University 2023

3rd Place – Creative Convergence Capstone Design Competition, Hongik University 2023

4th Place – Future Automotive Autonomous Driving Competition, Future Automotive Education Council 2023

2nd Place – University Comprehensive Design Competition, Hongik University 2022

3rd Place – Creative Convergence Capstone Design Competition, Hongik University 2022

Teaching & Tutoring Experience

Peer Tutor, Hongik University 2022 – 2023
Mentored underperforming students across 4 semesters, guiding academic recovery and study strategies.

Course Tutor, Hongik University 2022 – 2023
Assisted students in Physics, Chemistry, and Fluid Mechanics, reinforcing theoretical understanding and problem-solving.

Volunteer Math Tutor, Hongik University Autumn 2022
Offered one-on-one tutoring sessions in mathematics; acknowledged with a volunteer scholarship.

Teaching Assistant – Mechanical Engineering Dept., Hongik University Spring 2023
Supported practical sessions in CATIA software, guiding students in design modeling and CAD practice.

Teaching Assistant – Mathematics Dept., Hongik University 2023
Graded assignments and provided feedback under faculty supervision, ensuring consistent evaluation standards.

Additional

Technological Skills: Proficient in ANSYS FLUENT, Altair Acusolve, Catia, Creo, Inventor, Auto CAD, Python, C++ and MATHLAB