

EDUCATION

Korea Institute of Energy Technology (KENTECH)

Undergraduate

Major: Energy Engineering (Energy AI, Grid Modernization)

Mar. 2023 – Current

Naju-si, South Korea

Seoul National University (SNU)

Credit Transfer Student

Major : Department of Architecture

Dec. 2023 – Jan. 2024

Seoul, South Korea

Gwangju Science Academy (GSA)

37th graduation

Major: Physics

Mar. 2020 – Jan. 2023

Gwangju, South Korea

Worcester Polytechnic Institute (WPI)

Global Frontier

Major : Engineering Exploration

Jul. 2021 – Aug. 2021

Massachusetts, USA

RESEARCH INTERESTS

Smart Grid, Multimodal AI.

RESEARCH AND ACADEMIC EXPERIENCE

Research Experience

Undergraduate Researcher at Korea Institute of Energy Technology (KENTECH)

Intelligent Mobile Computing Lab (Naju-si, South Korea)

Sep. 2023 – Present

ONGOING AND COMPLETED PROJECTS

Ongoing Projects

- **Establishment of renewable energy based self-sufficient KENTECH microgrid roadmap:** We propose an open data platform based on KENTECH microgrid. Building Energy Management System (BEMS) and Community Energy Management System (CEMS) should be preceded to build Microgrid Management System (MGMS). The open energy platform includes power data, gas, hydrogen, weather observation data, and system control, which can be collected and managed together to provide cloud-connected services.

Completed Projects

- **Visiting Health Center Service 'EVER' (KENTECH STARTUP CAMP 2023):** This service is designed to relieve the inconvenience caused by the lack of insurance system for minor injuries that occur while driving a motorcycle. It is a service that delivers disposable medical kits (medicine, user manual) quickly by entering symptoms and location using a mobile application. KENTECH will complete prototype verification and expand its scale to city, province and country.
- **Revitalizing Villages using Renewable Energy and "ECO-SPARK" ('RE100 Energy Prosumer Living Lab Challenge' 2023 NEXT Imagination Idea Tone):** Resolving the crisis of village extinction in Daesil Village, located in Naju, Jeollanam-do, and presenting eco-friendly content plans. Electric bicycles are charged using a small grid linked to solar power, wind power, and ESS, and tourists who come to the village can see the village by renting it. In the process, tourists enjoy village tours and photo zones, while villages generate profits and create jobs.

- **Small Microalgae Culture Plant for Distributed Microalgal Biomass Production in Urbanized Area (Association for Carbon-Neutral Circular Economy (ACCE) International Conference):** The idea is to develop a small chamber capable of culturing microalgae in a narrow outdoor space. A spatial analysis algorithm using environmental geographic data recommends the installation size of a small microalgae culture device, explores the optimal conditions for culture, and automates it to utilize microalgae as an efficient energy production resource. It proposes a system that allows resources to be returned to the community and aims to become one of the big common challenges within the region.
- **Latex-based Graph Formation Using Deep Learning-Based Formula OCR and GeoGebra (High School Research & Education (R&E) Project):** Automatically graph a handwritten formula. To this end, a deep learning model that OCRs handwritten numbers is designed using the Tensorflow library and converted into Latex grammar. It is connected to the GeoGebra web to output a graph and present it to the user. It works with Mathpix, the most advanced OCR model, to increase accuracy.
- **Experiment and Numerical Analysis of Solar Thermal Energy System for Hot Water Supply (High School In-depth Self Research & Education (R&E) Project with GIST):** By maximizing the efficiency of solar heat panels, we verify whether solar heat power can replace all living hot water used in the dormitory of Gwangju Science Academy. An endothermic material called TiNOX was attached to the copper pipe, and the internal temperature was increased with a glass case. As a result, it was confirmed that it can be 100% replaced when operating in summer.
- **A Study of Screw Phenomena in Fluids passing through Elliptical Holes (National Science Exhibition):** Discovering the phenomenon of fluid passing through elliptical holes bending into screw form and exploring the cause. We theoretically analyze it using fluid dynamics and Plateau – Rayleigh instability and conduct experiments using oval holes with different fluids and different eccentricities.
- **A Theoretical Black Hole & A Comparison Between Black Hole Observation and Film (GIST Creative Research Program):** It explains the physical background of Gargantua, a black hole in the film Interstellar, and compares the actual similarity between the black hole in the film and the actual black hole. Here we use general relativity, event horizon, Schwarzschild radius, singularity, and gravitational lens effects.
- **Domino's Kinetic Energy of Change According to Various Variables (High School Basic Self-Research & Education (R&E) Project):** Analyze the kinetic energy of the last domino according to the size, spacing, and initial force of the dominoes. This is followed by creating and experimenting with dominoes of various materials and sizes, and comparing the data analyzed using the tracker program with theoretical values.
- **Exploration of the Yongmaru Trail Inoculation Tree (High School Exploration of Nature Project):** Inoculation refers to the phenomenon in which two trees growing close together merge into one tree after a long period of time. The cause of the occurrence was explored by directly observing the inoculation tree on the Yongmaru Trail. It is caused by the combination of different single cake leaf plants, and although they do not exchange substances, they appear to be physically in contact.

PROGRAMMING AND TECHNICAL SKILLS

Languages: C, C++ for Arduino, MATLAB, and Python.

Developer Tools: Jupyter Notebook, PyCharm, and Visual Studio Code.

Technologies/Frameworks: Fusion 360, Latex, MS Office, SketchUp, Ultimaker Cura and Zoom

DISTINCTION AWARDS

- **Silver Award** KENTECH STARTUP CAMP 2023 (Co-winning, 5 persons, Prize money: 300,000 KRW).
- **Gold Award** 'RE100 Energy Prosumer Living Lab Challenge' 2023 Next Imagination Idea Tone (Co-winning, 3 persons, Injuries: Samsung Galaxy Tab).
- **Student Declaration** Representative Student Declaration for Undergraduate Freshmen in 2023 (2 persons).
- **President 1 Scholarship** from KENTECH, 136,300,000 KRW.
- **Bronze Award** GSA Deep Self-Research Contest (Physics Section).
- **Encouragement Award** National Science Exhibition (Co-winning, 3 persons).

- **Bronze Award** GSA Mathematics Science Fair (Mathematics Section).
- **Silver Award** Gwangju Science Club Activity Presentation Conference (Co-winning, 3 persons).
- **Excellence Award** Science Exhibition of Gwangju (Co-winning, 44 persons).
- **Silver Award** GSA Basic Self-Research Contest (Physics Section).
- **Silver Award** GSA Bio Microscopic Photo Exhibition.

LANGUAGE PROFICIENCY

- **English** (Fluent).
- **Korean** (Mother tongue).