# Hyunah Ko

Github: https://github.com/HYUNAHKO
Email : kha9867@yonsei.ac.kr


## Education

- **Yonsei University** — Seoul, South Korea
  *B.S. in Civil and Environmental Engineering* — *Mar. 2022 – Present*
  *Double Major: Computer Science* — *GPA: 3.95/4.5*

## Research Interests

My research goal is to develop advanced frameworks for 3D scene understanding and generation that enable (1) physically plausible 3D dynamic synthesis, (2) high-quality neural rendering with accurate material modeling, and (3) seamless integration with generative AI models. Particularly, my interests include:

- Physics-based 3D dynamic scene synthesis
- Diffusion models for 3D content generation
- Neural rendering and 3D Gaussian Splatting

## Team Projects

- **Startup Investment Round Prediction via BM-based Clustering** — *May. 2025 – Sep. 2025*
  Predicted investment rounds (Seed–IPO) using multi-source time-series data. Validated BM clusters via statistical metrics (Cohesion/Separation) and identified stage-specific growth factors.
- **Single Image to 3D Generation via Video Diffusion and Gaussian Splatting** — *Apr. 2025 – May. 2025*
  Developed a unified framework integrating **CameraCtrl** and **3D Gaussian Splatting** to ensure temporal and geometric consistency. Optimized 3D mesh generation via SDS loss, achieving high-fidelity results; awarded **3rd Place at YAICON 6th**.
- **Recipe Recommendation via Object Detection and Knowledge Graph QA*** — *Oct. 2024 – Nov. 2024*
  Built a recipe recommendation system using YOLOv5 and knowledge-augmented prompts with Stable Diffusion image generation.
- **Pet Body Measurement via Depth Estimation** — *Oct. 2024 – Nov. 2024*
  Developed a depth-based system for pet body length measurement using MMPose and fine-tuned Depth Anything v2 with patch-wise refinement.
- **Generative Pet Memorials with LLaMA3 and Stable Diffusion** — *Aug. 2024 – Sep. 2024*
  Generated personalized pet letters and images using LoRA-finetuned LLaMA3 and Stable Diffusion with ControlNet and style transfer.
- **LLM-based Personalized Health Report Generation** — *Jul. 2024 – Sep. 2024*
  Developed a personalized report generation system using medical LLMs and Retrieval-Augmented Generation.
- **Seoul Night Bus Route Analysis and Design*** — *Jul. 2024 – Aug. 2024*
  Analyzed public transportation and mobility data to identify underserved regions in Seoul. Applied EDA and regression modeling to propose new night bus routes based on demand patterns.
- **Room Generation with Stable Diffusion and ControlNet*** — *Apr. 2024 – May. 2024*
  Trained a customized model using ControlNet and Stable Diffusion to generate personalized room images from segmentation and depth data.
- **A(uto)ssignment: Automated Problem Extraction from Textbooks** — *Mar. 2024 – Apr. 2024*
  Built an automated pipeline using YOLOv7 and PORORO OCR to detect and extract questions from textbook PDFs, enabling custom problem set generation.
- **Traffic Commute Analysis for Northern & Southern Seoul** — *Jan. 04, 2024 – Jan. 30, 2024*
  Analyzed ridership and station data to identify high-congestion areas in commutes from Gyeonggi Province to Seoul using EDA and statistical methods.

* Served as a team leader.

## Papers

- **Fourier Decomposition for Explicit Representation of 3D Point Cloud Attributes**
  Donghyun Kim, Hyunah Ko, Chanyoung Kim, Seong Jae Hwang, arXiv preprint arXiv:2503.10055, 2025.
- **Backbone Augmented Training for Adaptations**
  Jae Wan Park, Junhyeok Kim, Youngjun Jun, Hyunah Ko, Seong Jae Hwang, AAAI 2026 Workshop on Artificial Intelligence with Biased or Scarce Data, 2026. Oral
- **DiTracker: Repurposing Video Diffusion Transformers for Robust Point Tracking**
  Soowon Son, Honggyu An, Chaehyun Kim, Hyunah Ko, Jisu Nam, Dahyun Chung, Siyoon Jin, Jung Yi, Jaewon Min, Junhwa Hur, Seungryong Kim, arXiv preprint arXiv:2512.20606, 2025.
- **C3G: Learning Compact 3D Representations with 2K Gaussians**
  Honggyu An*, Jaewoo Jung*, Mungyeom Kim, Sunghwan Hong, Chaehyun Kim, Kazumi Fukuda, Minkyeong Jeon, Jisang Han, Takuya Narihira, Hyunah Ko, Junsu Kim, Yuki Mitsufuji, Seungryong Kim, arXiv preprint arXiv:2512.04021, 2025.

## Research Experiences

- **Environmental Biotechnology & Thermal Laboratory (eBTL), Yonsei Univ.** Seoul, South Korea
  *Undergraduate Researcher (Advisor: Prof. Joonhong Park)* *Jul. 2023 - Sep. 2023*
- **Medical Imaging and Computer vision, Yonsei Univ.** Seoul, South Korea
  *Undergraduate Researcher (Advisor: Prof. Seong Jae Hwang )* *Jul. 2024 - Jul. 2025*
- **CVLAB, KAIST AI.** Seoul, South Korea
  *Undergraduate Researcher (Advisor: Prof. Seungryong Kim )* *Jul. 2025 - Present*

## Relevant Courseworks

- **Spring 2023**
  - **UNDERSTANDING AND USING AI** : A+ (4.3/4.3)
- **Fall 2023**
  - **LINEAR ALGEBRA AND ITS APPLICATION** : A- (3.7/4.3)
- **Spring 2024**
  - **ARTIFICIAL INTELLIGENCE AND WATER INFORMATICS** : A- (3.7/4.3) *(G1)*
  - **DATA STRUCTURES** : A+ (4.3/4.3)
- **Fall 2024**
  - **INTRODUCTION TO AI AND ITS APPLICATION** : A+ (4.3/4.3)
  - **NATURAL LANGUAGE PROCESSING AND CHATGPT** : A+ (4.3/4.3)
  - **OBJECT-ORIENTED PROGRAMMING** : A0 (4.0/4.3)

## Skills

- **Programming Languages**: Python (Expert), Java (Advanced), C++ (Intermediate), JavaScript (Beginner)
- **Development Tools**: Git, Docker, Linux/Unix, Matlab
- **Languages**: Korean (Native), English (Proficient)

## Honors and Awards

- **Grand Prize, 2024 Jeju Satellite Data Utilization Competition** *Jul. 2024 – Aug. 2024*
  Proposed a data-driven solution and business model to address regional issues in Jeju Island by analyzing satellite imagery and identifying actionable insights.
- **77th out of 514, AirQo African Air Quality Prediction Challenge, Zindi** *Mar. 2024 – Jun. 2024*
  Developed a model to estimate air pollution levels using satellite imagery, addressing the high cost of ground-based sensor networks in large regions like Africa.

## Extracurricular Activities

- **Yonsei Computer Club** *Sep. 2023 – Present*
  *Vice President (Feb. 2024 – Feb. 2025)*
- **Yonsei Artificial Intelligence** *Dec. 2023 – Present*
  *Vice President (Jan. 2025 – Present)*
- **Yonsei Data Science Lab** *Dec. 2023 – Nov. 2024*