

Kyubeom Han

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Research Interest

My research focuses on accelerating physically-based rendering methods using recent deep-learning techniques. I also have a broad interest in neural rendering methods (e.g., neural radiance fields, and point-based rendering).

Education

KAIST (Korea Advanced Institute of Science and Technology) Ph.D. in Computer Science	Daejeon, KOR Aug. 2023–
KAIST (Korea Advanced Institute of Science and Technology) M.S. in Computer Science – GPA: 4.2/4.3	Daejeon, KOR Aug. 2021–Aug. 2023
KAIST (Korea Advanced Institute of Science and Technology) B.S. in Computer Science, minor in Electric Engineering – Cum Laude (GPA: 3.8/4.3)	Daejeon, KOR Feb. 2017–Aug. 2021
Korea Science Academy of KAIST High-school for science-gifted students in Korea	Busan, KOR Feb. 2014–Feb. 2017

Publications

- [1] **K. Han**, O. G. Odenthal, W. Kim, and S. Yoon, "Pixel-wise guidance for utilizing auxiliary features in monte carlo denoising", ACM SIGGRAPH Symposium on Interactive 3D Graphics and Games, pp. 1–19, 2023.
- [2] Y. Wang, **K. Han**, J. Kim, and S. Yoon, "User-controlled layout editing with neural style transfer", Proceedings of the Korea Computer Graphics Society Conference, pp. 66–67, 2023.
- [3] **K. Han** and S. Yoon, "Monte carlo image denoising using spatial information of light bounces", Proceedings of the Korean Information Science Society Conference, pp. 1438–1440, 2022.

Research Experience

Graduate Student Researcher on SGVR lab KAIST Computer Science – Research Theme : Deep-learning based Monte Carlo Noise Reduction – Work accepted for I3DG and PACMCGIT (first author)	Aug. 2021–Present
Undergraduate Student Researcher on SGVR lab KAIST Computer Science – Studied Weak-supervision on path manifold space for Monte Carlo Denoising. – Participated on 2021 Winter/Spring Undergraduate Research Program with supervision of Prof. Yoon	Jul. 2020–Jul. 2021

- Achieved an **Excellence Award** for 2021 Winter/Spring Undergraduate Research Program
- Title : Contribution of Auxiliary Features to Monte Carlo Denoisers based on Deep Learning

Undergraduate Student Researcher on ACE lab

Jun. 2018–Aug. 2018

KAIST Chemistry

- Optimized ACE-Molecule, a quantum chemistry software
- Improved 10x of calculation speed on sparse matrices for ground-state density functional (DFT)

Work Experience

Undergraduate Internship

Dec. 2019–Feb. 2020

Humelo. inc

- Crawled and preprocessed Korean poetry data for poetry-like phrase generator using Python, PostgreSQL, and Android emulator
- Refactored front-end and database of the survey website using Django and SQLite

Undergraduate Internship

Dec. 2018–Feb. 2019

SK Hynix

- Reimplemented an algorithm to check the security of DDR4 RAM against rowhammer attack

Scholarships and Awards

- **Best M.S Thesis Award**, Korea Computer Graphics Society 2023
- **Outstanding TA Award** for 2022 Fall, KAIST School of Computing 2022
- **Outstanding TA Award** for 2022 Spring, KAIST School of Computing 2022
- **Excellence Award** for 2021 Winter/Spring Undergraduate Research Program in KAIST 2021
- **Korea Presidential Science Scholarship** (\$10K per year) 2017–2020

Invited Talks & Writings

Pixel-wise Guidance for Utilizing Auxiliary Features in Monte Carlo Denoising

2023

Korea Computer Graphics Society Conference

Computer Graphics: Creating a New World Inside the Computer

2023

Wrote section of the KAIST magazine "Behind Science"

Accelerating Deep-Learning-Based Denoising Methods with High Performance Computing

2022

Talk at the GPU tutorial of 2022 Korea Supercomputing Conference

Teaching

- **Teaching Assistant**, Computer Graphics (CS580) 2023 Fall
- **Teaching Assistant**, Data Structure (CS206) 2023 Spring, 2022 Fall, 2022 Spring
- **Teaching Assistant**, Interactive Computer Graphics (CS482) 2021 Fall

Skills

- **Programming Languages & Software** Python, C, C++, MATLAB, CUDA
- **Tools** PyTorch, PostgreSQL, Scrapy, Django, PZFlex, Node.js
- **Language** Korean (Native), English (TOEIC 975)

Projects

Specific details and links are available on qbhan.oopy.io.

Kernel Refinement for Monte Carlo Denoising using Pixel-wise Discriminator 2022

Class Project (Computer Graphics CS580, A+)

Voted as best project

- Refine denoising kernel based on pixel-wise score of the U-Net discriminator

Contribution of Auxiliary Features to Monte Carlo Denoisers based on Deep Learning 2021

Research Project (**Excellence Award** on Undergraduate Research Program in 2021)

- Analyzing & Enhancing contributions of auxiliary features (albedo, normal, and depth) by adding channel attention to existing denoisers
- Applied multi-task learning by adding auxiliary tasks of reconstructing auxiliary features from a denoised image to enhance the semantics of auxiliary features

Motion Detector for Interactive Online Real-time Class 2020

Class Project (Introduction to AI CS470, A+)

- Detects simple hand gestures and alarms sudden movement for interactive online classes using Zoom
- Contributing to preprocessing hand gesture data and training the gesture classification model