

Hyojoon Park

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Introduction

- My research focuses on the synergistic application of **Machine Learning** to **Computer Graphics** and **Computer Vision**. I have extensive experience building end-to-end systems that combine physics based simulation, geometry, and image/video processing.
- My work spans various domains, including **3D reconstruction** of the face, body, and hands, as well as **XR (VR/AR)** and **haptics**. With deep technical expertise across diverse domains, I have peer-reviewed publications in both Computer Graphics and Medical Imaging.
- Currently, I focus on efficient **deep learning based 4D medical image and video compression** to make high dimensional data practical for storage and analysis.

Education

University of Wisconsin-Madison

Wisconsin, USA

Ph.D. Candidate in Computer Sciences

Sep. 2021 - Current

- **Research area:** Synergistic integration of machine learning in physics-based simulation for computer graphics and medical imaging
- **Advisor:** Professor Eftychios Sifakis, **Co-advisor:** Professor Kevin Elceiri

Seoul National University

Seoul, Korea

M.S. in Mechanical Engineering

Mar. 2017 - Feb. 2019

- **Research area:** Rendering and transparent control of high-performance haptic system
- **Thesis:** Dental Simulator with Increased Z-width of Haptic Rendering (also presented at AsiaHaptics 2018)
- Selected for **Outstanding MS Thesis Presentation Award** [[M.S. thesis presentation](#)]
- **Advisor:** Professor Dongjun Lee

Technical University of Munich (TUM)

Munich, Germany

B.S. Exchange Student in Mechanical Engineering

Spring 2014

Korea University

Seoul, Korea

B.S. in Mechanical Engineering

Mar. 2010 - Feb. 2017

- Military service: Jun. 2011 - Mar. 2013

Publications

• Near-realtime Facial Animation by Deep 3D Simulation Super-Resolution

Hyojoon Park, Sangeetha Grama Srinivasan, Matthew Cong, Doyub Kim, Byungsoo Kim, Jonathan Swartz, Ken Museth, Eftychios Sifakis

ACM Transactions on Graphics (TOG), 2024 (Presented at SIGGRAPH ASIA 2024) [[paper](#)] [[code](#)]

- Achieves high-resolution facial animation 115x faster (at 18 FPS) than traditional methods while maintaining simulation quality, generalized to unseen expressions and dynamics.

• Collagen Fiber Centerline Tracking in Fibrotic Tissue via Deep Neural Networks with Variational Autoencoder-based Synthetic Training Data Generation

Hyojoon Park*, Bin Li*, Yuming Liu, Michael S. Nelson, Helen M. Wilson, Eftychios Sifakis, and Kevin W. Elceiri (*equal contributions)

Medical Image Analysis, 2023 [[paper](#)][[code](#)]

- Facilitates training of deep learning models with limited annotated data by generating diverse synthetic datasets via a novel property-controllable variational autoencoder.

• Capturing Detailed Deformations of Moving Human Bodies

He Chen, **Hyojoon Park**, Kutay Macit, and Ladislav Kavan

SIGGRAPH, 2021 [[paper](#)][[code](#)]

- Enables accurate, detailed 3D reconstruction of moving human bodies using a novel motion capture system with a specially designed low-cost suit, utilizing deep neural networks and geometric algorithms.

• Adaptive Precision-Enhancing Hand Rendering for Wearable Fingertip Tracking Devices

Hyojoon Park and Jung-Min Park

IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2020 [[paper](#)][[video](#)]

- Enhances visual plausibility and precision of 3D hand rendering in VR using motion retargeting and novel hinge constraints for real-time inverse kinematics.

- **Dental Simulator with Increased Z-width of Haptic Rendering**
Hyojoon Park, Myungsin Kim, and Dongjun Lee
AsiaHaptics, 2018 [\[paper\]](#)[\[video\]](#)
 - Achieves up to 10x greater maximum stiffness (Z-width) from virtual teeth using commercially available haptic devices.
- **Rigid-body Collaborative Manipulation among Remote Users with Wearable Cutaneous Haptic Interfaces**
Myungsin Kim, WonHa Lee, **Hyojoon Park**, Junghan Kwon, Yong-Lae Park, and Dongjun Lee
AsiaHaptics, 2018 [\[paper\]](#)[\[video\]](#)
 - Introduces a remote multiuser collaboration system via wearable cutaneous haptic interfaces, leveraging passivity-based simulations for stable and realistic interactions.
- **Stretchable Skin-Like Cooling/Heating Device for Reconstruction of Artificial Thermal Sensation in Virtual Reality**
Jinwoo Lee, Heayoun Sul, Wonha Lee, Kyung Rok Pyun, Inho Ha, Dongkwan Kim, **Hyojoon Park**, Hyeonjin Eom, Yeosang Yoon, Jinwook Jung, Dongjun Lee, and Seung Hwan Ko
Advanced Functional Materials, 2020 [\[paper\]](#)
 - Introduces a stretchable, bi-functional skin-like thermo-haptic (STH) device for VR, capable of precise cold and hot sensations with a single structure and 230% stretchability.
- **Wearable Cutaneous Haptic Interface with Soft Sensors and IMUs**
Yongjun Lee, Myungsin Kim, Yongseok Lee, **Hyojoon Park**, and Dongjun Lee
Korea Robotics Society Annual Conference, 2018
- **Design and Performance Evaluation of Wearable Haptic Interfaces**
WonHa Lee, Myungsin Kim, **Hyojoon Park**, and Dongjun Lee
International Conference on Control, Automation and Systems, 2018

Work Experience

Google

Student Researcher

- (in progress)

Playa Vista, CA, USA

Sep. 2025 - Current

Nokia Bell Labs

Industrial Metaverse Intern

- Built real-time 3D Gaussian Splatting scenes with precise physical registration (scale and orientation) and language features for natural language queries as part of "Empowering Digital Twins with Precise Physical Registration and Language Awareness." The project was selected as the 1st place winner among 100+ global interns.

New Providence, NJ, USA

June 2025 - Aug. 2025

NVIDIA

Software Intern – Physics-Based Simulations

- Worked on age augmented 3D face models by expanding the training data with synthetic faces spanning from infants to the elderly, so the model covers a much wider age range. Also developed a single portrait 3D face reconstruction framework that can infer age along with geometry, enabling re-aging and de-aging of the reconstructed face.

Santa Clara, CA, USA

May 2024 - Aug. 2024

University of Utah

Graduate Research Assistant

- Worked on "Capturing Detailed Deformations of Moving Human Bodies" (SIGGRAPH 2021 / TOG), which captures 1,000+ uniquely labeled body points from multi-camera images using a patterned suit and neural networks that localize corners and recognize codes, robust to stretching and self-occlusion. Open-sourced the multi-camera calibration pipeline used in the project (MultiCamCalib), including checkerboard corner detection and bundle adjustment. [\[code\]](#) [\[paper\]](#)

Salt Lake City, UT, USA

Sep. 2019 - Jun. 2021

Korea Institute of Science and Technology (KIST)

Research Intern

- Worked on "Adaptive Precision Enhancing Hand Rendering for Wearable Fingertip Tracking Devices" (IROS 2020), improving visual plausibility and precision of real-time 3D hand rendering in VR using motion retargeting and real-time inverse kinematics. [\[paper\]](#) [\[video\]](#)

Seoul, Korea

Mar. 2019 - Aug. 2019

Republic of Korea Army (ROKA)

Military Service

- Completed full 21 months of mandatory military service as a military English interpreter.

Seoul, Korea

Jun. 2011 - Mar. 2013

Korea Advanced Institute of Science and Technology (KAIST)

Instructor for KAIST New Education

- Taught "Arduino-based Exploration Robot" and "Developing Android Service App" classes to middle and high school students.

Seoul, Korea

Sep. 2014 - Feb. 2015

Teaching Assistant

Computer Graphics (CS559) *University of Wisconsin-Madison*

Spring 2022

Computer Graphics (CS559) *University of Wisconsin-Madison*

Fall 2021

Interactive Computer Graphics (CS6610) *University of Utah*

Spring 2021

Computer Graphics (CS4600) *University of Utah*

Fall 2020

System Analysis in Mechanical Engineering *Seoul National University*

Spring 2018