



Hah Min Lew

PH.D. STUDENT · KOREA UNIVERSITY

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"Bridging AI research and scalable solutions for measurable real-world impact."

Biography

Ph.D. student at the Visual & General Intelligence (VGI) Lab, Korea University, supervised by Prof. Gyeong-Moon Park. Current research focus lies in Vision-Language-Action (VLA) models, Vision-Language-Navigation (VLN) models, and multimodal generative models.

Prior to academia, professional experience includes over three years as an AI Researcher at Klleon AI Research. Key contributions involved photo-realistic 3D human generation, enabling lifelike avatar movements and lip-sync. Holds both M.S. and B.E. degrees from DGIST, with a strong foundation in Deep Learning and Signal Processing, advised by Prof. Jae Youn Hwang.

Skills

Programming Python, Bash, MATLAB, C, Java

Frameworks PyTorch, TensorFlow, Keras, Scikit-learn, Pytorch3D

DevOps Docker, Containerd, Git

Back-end Basics Node.js

Front-end Basics HTML, CSS, JavaScript

Languages Korean, English

Education

Korea University

PH.D. IN ARTIFICIAL INTELLIGENCE

- Advisor: Prof. Gyeong-Moon Park

Seoul, South Korea

Mar. 2026 - present

DGIST (Daegu Gyeongbuk Institute of Science and Technology)

M.S. IN ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

- Advisor: Prof. Jae Youn Hwang

Daegu, South Korea

Mar. 2019 - Aug. 2022

DGIST (Daegu Gyeongbuk Institute of Science and Technology)

B.E. IN SCHOOL OF UNDERGRADUATE STUDIES

- Best Project Award

Daegu, South Korea

Mar. 2014 - Feb. 2019

Experience

Kleon AI Research

AI RESEARCHER

- Accelerated inference using a training-free diffusion sampler ($\uparrow 4.11\times$).
- Developed audio-driven 3DMM generation for virtual avatars with natural human-like expressions and movements. ($LVE \downarrow 27.5\%$, $FDD \downarrow 28.9\%$, $MEE \downarrow 27.1\%$, $CE \downarrow 24.1\%$, $Diversity \uparrow 17.7\%$)
- Developed a photorealistic head rendering model using Gaussian Splatting, outperforming 5 state-of-the-art models. ($MSE \downarrow 59.96\%$, $PSNR \uparrow 4.41dB$, $SSIM \uparrow 3.85\%$, $LPIPS \downarrow 38.16\%$)
- Developed a Head Swap AI model with 212.7x speedup, reducing annual GPU costs by 99.53% (from \$2.2M to \$10.5K).
- Built large-scale multimodal data pipelines (9.41M+ frames from in-the-wild videos).
- Integrated external APIs (NVIDIA Omniverse Audio2Face, OpenAI ChatGPT, TTS) into a streaming avatar system, achieving 25-28 FPS performance.

Seoul, South Korea

Aug. 2022 - Feb. 2026

Multimodal Biomedical Imaging and System Lab, DGIST

GRADUATE RESEARCHER

- Achievements: 6 SCIE publications, 7 international conferences, 9 projects, 4 patents, and 2 awards.
- Designed machine learning-based anomaly detection systems and generative models for biomedical imaging, focusing on multimodal, class-imbalance, and multi-task learning.
- Developed hardware-software integrated systems for application-specific use cases.
- Collaborative research with medical doctors from hospitals, including SNUH, SNUDH, and Yonsei Severance.

Daegu, South Korea

Mar. 2019 - Aug. 2022

Publications

[C5] Personalized Audio-driven Whole-body Talking Avatars	Co-Author
S. LEE, S. MOON, HAH MIN LEW, J.-S. KANG, AND G.-M. PARK. CVPR 2026	Jun. 2026
[C4] Dynamic Texture Modeling of 3D Clothed Gaussian Avatars from a Single Video	Co-Author
S. LEE, S. MOON, HAH MIN LEW, J.-S. KANG, AND G.-M. PARK. ICLR 2026	Apr. 2026
[C3] GeoAvatar: Adaptive Geometrical Gaussian Splatting for 3D Head Avatar	First Author
S. MOON*, HAH MIN LEW*, S. LEE, J.-S. KANG, AND G.-M. PARK. ICCV 2025	Apr. 2026
[C2] Towards High-fidelity Head Blending with Chroma Keying for Industrial Applications	First Author
HAH MIN LEW*, S.-M. YOO*, H. KANG*, AND G.-M. PARK. WACV 2025	Feb. 2025
[C1] CSS-Net: Classification and Substitution for Segmentation of Rotator Cuff Tear	Co-Author
K. LEE, HAH MIN LEW, M. H. LEE, M. KANG, J. KIM, AND J. Y. HWANG. ACCV 2022	Dec. 2022
[J6] Deep Learning-based Framework for Fast and Accurate Acoustic Hologram Generation	Co-Author
M. H. LEE, HAH MIN LEW, S. YOUN, T. KIM, AND J. Y. HWANG. IEEE TUFFC (IF: 3.267)	Nov. 2022
[J5] Multi-task and Few-shot Learning-based Fully Automatic Deep Learning Platform for Mobile Diagnosis of Skin Diseases	Co-Author
K. LEE, T. C. CAVALCANTI, S. KIM, HAH MIN LEW, D. H. LEE, AND J. Y. HWANG. IEEE JBHI (IF: 7.021)	Jul. 2022
[J4] Speckle Reduction via Deep Content-Aware Image Prior for Precise Breast Tumor Segmentation in an Ultrasound Image	Co-Author
H. LEE, M. H. LEE, S. YOUN, K. LEE, HAH MIN LEW, AND J. Y. HWANG. IEEE TUFFC (IF: 3.267)	Jul. 2022
[J3] Intelligent Smartphone-based Multimode Imaging Otoscope for the Mobile Diagnosis of Otitis Media	Co-Author
T. C. CAVALCANTI, HAH MIN LEW, K. LEE, S. LEE, M. K. PARK, AND J. Y. HWANG. BIOMEDICAL OPTICS EXPRESS (IF: 3.562)	Nov. 2021
[J2] Ultrasonic Blood Flowmeter with a Novel Xero Algorithm for a Mechanical Circulatory Support System	First Author
HAH MIN LEW, H. SHIN, M. H. LEE, S. YOUN, H. C. KIM, AND J. Y. HWANG. ULTRASONICS (IF: 4.062)	Aug. 2021
[J1] Forward-Looking Multimodal Endoscopic System Based on Optical Multispectral and High-Frequency Ultrasound Imaging Techniques for Tumor Detection	Co-Author
J. KIM, HAH MIN LEW, J. KIM, S. YOUN, H. A. FARUQUE, A. N. SEO, S. Y. PARK, J. H. CHANG, E. KIM, AND J. Y. HWANG. IEEE TMI (IF: 11.037)	Oct. 2020

Projects

Audio-driven 3D Facial Animation for Realistic Facial Expressions and Motion	Seoul, South Korea
PROJECT LEAD	Dec. 2024 - Feb. 2026
<ul style="list-style-type: none">Developed a 3D facial animation framework for lifelike facial expressions and motion driven by audio inputs.Constructed a large-scale paired dataset of audio and 3DMM parameters (6.81M+ frames).Achieved superior performances compared to the SOTA method (LVE ↓27.5%, FDD ↓28.9%, MEE ↓27.1%, CE ↓24.1%, Diversity ↑17.7%).Accelerated diffusion sampling process 4.11x speed-up while preserving qualitative performances.Used skills: Python, PyTorch, Git.	
Real-time Expressive 3D Chat Avatar System	Seoul, South Korea
PROJECT LEAD	Apr. 2024 - Dec. 2024
<ul style="list-style-type: none">Integrated NVIDIA Omniverse Audio2Face, OpenAI ChatGPT, and TTS APIs into a streaming avatar dialogue system with 25-28 FPS performance.Designed an emotion message queue protocol to enable natural emotional transitions and realistic facial expressions in avatars.Optimized Numpy-to-Tensor conversion and computations for live streaming, achieving a 13.5% speed improvement.Used skills: Python, PyTorch, Docker, Containerd, Git.	
High-performance Real-time Head Swapping System	Seoul, South Korea
PROJECT LEAD	Aug. 2022 - Apr. 2024
<ul style="list-style-type: none">Led the development of a state-of-the-art head swapping framework, including data preprocessing pipelines, multi-GPU training, and efficient inference mechanisms.Built a high-quality dataset from 15,354 videos of 3,592 identities, processing 2.6M frames.Achieved a 212.7x inference speedup (from 10s/frame to 47ms/frame), reducing GPU resource requirements by 99.53%.<ul style="list-style-type: none">Reduced annual GPU costs from \$2.2M+ (assuming 213 AWS EC2 g4dn.4xlarge instances) to approximately \$10.5K (using a single instance).Achieved significant performance improvements over the SOTA method:<ul style="list-style-type: none">Metrics: PSNR ↑55.5%, LPIPS ↓91.8%, L1 ↓88.8%, SSIM ↑21.8%Inference speed: 60.57 FPS (↑53.6%)Computational efficiency: Parameters 8.92M (↓63.4%), MACs ↓33.0%Used skills: Python, PyTorch, Docker, Git, JavaScript, HTML, CSS.	

ADDITIONAL PROJECTS

Image-to-Image Translation for High-resolution Gastrointestinal Imaging	PROJECT LEAD	Feb. 2021 - Sep. 2023
Multitask Learning-based Network for Rotator Cuff Tear Segmentation	PROJECT MEMBER	Dec. 2021 - Dec. 2022
Low-voltage CMUT-based Ultrasound Imaging for Medibots	PROJECT MEMBER	Sep. 2020 - Dec. 2022
AI-powered Smartphone Imaging for Early Dental Caries Detection	PROJECT LEAD	Apr. 2020 - Feb. 2022
ML-based Smartphone Imaging for Otitis Media Diagnosis	PROJECT MEMBER	Feb. 2020 - Jan. 2022
2021 Laboratory-specialized Start-up Leader University Project	PROJECT MEMBER	Aug. 2021 - Jan. 2022
Smart Monitoring System for Hip Implants	PROJECT MEMBER	Feb. 2019 - May. 2021
Optimized Biomedical Monitoring System with a Time-efficient Algorithm	PROJECT LEAD	Mar. 2019 - Mar. 2021
Technical Commercialization Activity Support for Bio Society Leadership	PROJECT MEMBER	May. 2020 - Dec. 2020
Multimodal Data Registration and Analysis for Tumor Detection	PROJECT MEMBER	Mar. 2019 - Oct. 2020
Ultrasonic Capsule Endoscopy	PROJECT MEMBER	Jun. 2019 - Jun. 2020

Patents

COMPUTING DEVICE FOR HEAD SWAPPING	<i>Application</i>
HAH MIN LEW , H. KANG, S.-M.YOO, G.-M.PARK (WO2025042068A1, KR1020230154188A)	Feb. 2025
MOBILE OTOSCOPE SYSTEM	<i>Patent</i>
J. Y. HWANG, T. C. CAVALCANTI, HAH MIN LEW (KR102648059B1)	Mar. 2024
ULTRASONIC BLOOD FLOW MEASURING APPARATUS AND METHOD THEREOF	<i>Patent</i>
J. Y. HWANG, HAH MIN LEW , H. C. KIM (KR102514633B1)	Mar. 2023
BLADDER MONITORING APPARATUS AND METHOD FOR CONTROLLING BLADDER MONITORING APPARATUS	<i>Patent</i>
J. Y. HWANG, M. H. LEE, HAH MIN LEW (KR102460829B1)	Oct. 2022
THREE-DIMENSIONAL DIAGNOSTIC SYSTEM	<i>Patent</i>
J. Y. HWANG, J. KIM, HAH MIN LEW (KR102379481B1)	Mar. 2022

Awards & Scholarships

AWARDS

2021	Outstanding Poster Award , 2021 Student Conference at DGIST	<i>Daegu, South Korea</i>
2021	Best Paper Award , 2021 Spring Conference at KOSOMBE	<i>Remote, South Korea</i>
2017	Best Project Award , 2016 Undergraduate Group Research Project (UGRP) Program at DGIST	<i>Daegu, South Korea</i>

SCHOLARSHIPS

2014-2022	Full Government Scholarships , Full tuition exemptions and school expenses support	<i>Daegu, South Korea</i>
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References

Gyeong-Moon Park

ASSISTANT PROFESSOR

- Ph.D. in School of Electrical Engineering, KAIST, Seoul, South Korea. 2019.
- E-mail: gm-park@korea.ac.kr
- Office: Room #203B, Woo Jung Informatics Building

Seoul, South Korea

Mar. 2025 - present

Jae Youn Hwang

PROFESSOR

- Ph.D. in Biomedical Engineering, University of Southern California, Los Angeles, USA. 2009.
- E-mail: jyhwang@dgist.ac.kr
- Office: Room #413, E3 building

Daegu, South Korea

Sep. 2022 - present