

Sihyeon Kim [김시현 · 金時玄]



Summary

Final-year Ph.D. candidate in Computer Science at Korea University, advised by Prof. Hyunwoo J. Kim. My research focuses on generative models, 3D computer vision, and geometric representation learning, with current interests in neural solvers for generative ODEs, world models, and reasoning for generation.

Research interests: Generative models • Reasoning for generation • World models • 3D computer vision

Education

Ph.D. in Computer Science, Korea University Sep. 2019 – Present

Advisor: Prof. Hyunwoo J. Kim (expected graduation: Feb. 2027)

Entered through Korea University's combined M.S./Ph.D. track; doctoral phase since Sep. 2021.

B.S. in Biomedical Engineering, Korea University Mar. 2015 – Aug. 2019

Advisor: Prof. Joon-Kyung Seong

Research Experience

Visiting Scholar@Korea University (PI: Prof. Hyungjin Chung) Sep. 2026 – Present

[Reasoning for Generative Models]

- Integrating reasoning into the generation process, enabling generative models to iteratively reason about and refine evolving outputs, with a focus on image/video generation and world models.
- Keywords: reasoning for generation, latent reasoning, world models, generative models.

Visiting Scholar@University of Wisconsin–Madison (PI: Prof. Vikas Singh) Jun. 2025 – Nov. 2025

[Looping and Dynamics Analysis for Diffusion Models]

- Exploring looping for diffusion models and analyzing their sampling dynamics through self-consistency, stability, and curl/conservativeness.
- Keywords: diffusion models, looped inference, self-consistency, stability, curl.

Graduate Student Researcher@Korea University (PI: Prof. Hyunwoo J. Kim) Sep. 2019 – Present

[3D High-level Scene Understanding and Situation Prediction for Urban Drones] Mar. 2023 – Present

- Project lead** · 4-year grant from the National Research Foundation of Korea on 3D computer vision for urban drones.
- Keywords: aerial perception, 3D reconstruction, synthetic-to-real adaptation, 3D scene understanding, object detection.

[Development of 3D Orthodontic Software for Automatic Dental Set-Up] Feb. 2020 – Nov. 2021

- Project lead** · industry collaboration with MyLign, supported by the Ministry of SMEs and Startups.
- Keywords: 3D registration, 3D classification, 3D object detection, medical imaging.

Undergraduate Researcher@Korea University (PI: Prof. Joon-Kyung Seong) Mar. 2018 – Feb. 2019

- Brain CT segmentation and cortical neurodegeneration prediction for Alzheimer's disease diagnosis; joint work with Samsung Medical Center.
- Keywords: 3D segmentation, computed tomography (CT), machine learning, medical imaging.

Publications

Underlined = author * equal contribution

Climatology-Based Residual Correction with Neural Fields for Continuous Weather Downscaling

Seunghun Lee, Sihyeon Kim, Injae Kim, Minseo Yoon, and Hyunwoo J. Kim

Submitted to AAAI 2027, under review.

Learning to Solve Generative ODEs Beyond the Linear Span

Sihyeon Kim, Seunghun Lee, Vikas Singh[§], and Hyunwoo J. Kim[§]

Advances in Neural Information Processing Systems (NeurIPS), 2026 [Paper]

ST-VLM: Kinematic Instruction Tuning for Spatio-Temporal Reasoning in Vision-Language Models

Dohwan Ko*, Sihyeon Kim*, Yumin Suh, Vijay Kumar B.G, Minseo Yoon, Manmohan Chandraker, and Hyunwoo J. Kim

arXiv preprint, 2025 [Paper] [Project]

Constant Acceleration Flow

Dogyun Park, Sojin Lee, Sihyeon Kim, TaeHoon Lee, Youngjoon Hong, and Hyunwoo J. Kim

Advances in Neural Information Processing Systems (NeurIPS), 2024 [Paper] [Code]

Domain-agnostic Latent Diffusion Models for Synthesizing High-Quality Implicit Neural Representations

Dogyun Park, **Sihyeon Kim**, Sojin Lee, and Hyunwoo J. Kim

International Conference on Learning Representations (ICLR), 2024 [[Paper](#)] [[Code](#)]

Advancing Bayesian Optimization via Learning Correlated Latent Space

Seunghun Lee*, Jaewon Chu*, **Sihyeon Kim***, Juyeon Ko, and Hyunwoo J. Kim

Advances in Neural Information Processing Systems (NeurIPS), 2023 [[Paper](#)]

Semantic-Aware Implicit Template Learning via Part Deformation Consistency

Sihyeon Kim, Minseok Joo, Jaewon Lee, Juyeon Ko, Juhan Cha, and Hyunwoo J. Kim

International Conference on Computer Vision (ICCV), 2023 [[Paper](#)] [[Code](#)]

Self-positioning Point-based Transformer for Point Cloud Understanding

Jinyoung Park*, Sanghyeok Lee*, **Sihyeon Kim**, Yongyang Xiong, and Hyunwoo J. Kim

Conference on Computer Vision and Pattern Recognition (CVPR), 2023 [[Paper](#)] [[Code](#)]

Metropolis-Hastings Data Augmentation for Graph Neural Networks

Hyeonjin Park*, Seunghun Lee*, **Sihyeon Kim**, Jinyoung Park, Jisu Jeong, Kyung-Min Kim, Jung-Woo Ha, and Hyunwoo J. Kim

Advances in Neural Information Processing Systems (NeurIPS), 2021 [[Paper](#)] [[Code](#)]

PointWOLF: Point Cloud Augmentation with Weighted Local Transformations

Sihyeon Kim*, Sanghyeok Lee*, Dasol Hwang, Jaewon Lee, Seong Jae Hwang, and Hyunwoo J. Kim

International Conference on Computer Vision (ICCV), 2021 [[Paper](#)] [[Code](#)]

Patents

- **Generative model with arbitrary resolution and scale using a diffusion model and implicit neural network.** H. J. Kim, D. Park, **S. Kim**, S. Lee. *Korea patent application*, 2024.
- **3D data augmentation method using weighted local transformation and apparatus.** H. J. Kim, **S. Kim**, S. Lee, J. Park. *Korea patent application*, 2024.
- **Cortical neurodegeneration prediction in Alzheimer's disease using CT images.** S. W. Seo, J.-K. Seong, J. Kim, **S. Kim**. *Korea patent application*, 2021.

Professional Service

Conference reviewer: NeurIPS (2025-), ICLR (2026-), CVPR (2024-), ICCV (2025-), AAAI (2024-), MICCAI Workshop on Foundation Models for General Medical AI (2024).

Journal reviewer: IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI) (2023, 2024).

Talks

- **Evaluating Geometric Consistency for Video Generation Models** — Short talk @ NAVER AI Lab Mar. 2024
- **Introduction to 3D Computer Vision** — Guest lecture, Advanced Machine Learning @ Korea University May 2023

Teaching Experience

- Teaching Assistant, **Computer Vision** (AAA534), Korea University Spring 2020
- Teaching Assistant, **Machine Learning** (COSE362), Korea University Fall 2019
- Teaching Assistant, **Deep Learning**, NVIDIA AI Conference Fall 2018

Honors & Awards

- Google Student Travel Grant@ICCV 2023
- Teaching Assistantship, Korea University 2019, 2020
- Excellence Scholarship for Undergraduate Research Students, Korea University 2018

Languages

Korean (native) • English (fluent)