

JOO CHAN LEE

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I am a Ph.D. candidate in the Department of Artificial Intelligence at SungKyunKwan University, advised by Prof. Jong Hwan Ko and Prof. Eunbyung Park. My research spans **computer vision, graphics, and machine learning**, with a focus on efficient neural representation architectures from neural fields to recent advances in 3D Gaussian Splatting. In my recent work, I have concentrated on **efficient neural rendering for both static and dynamic scenes**, with a **strong interest in extending these methods to real-world applications** such as immersive AR/VR experiences, digital human modeling, autonomous robotics, and embodied AI systems.

EDUCATION

- Current** **Ph.D. in Artificial Intelligence**
 | SungKyunKwan University (SKKU), Suwon, Korea
 2020 Advised by Prof. Jong Hwan KO & Prof. Eunbyung PARK
 GPA: 4.42/4.5
- 2020 **B.S. in Information & Communication Engineering**
 | Inha University, Incheon, Korea
 2016 GPA: 3.97/4.5 (Top 7 %)

RESEARCH EXPERIENCE

- Current** **Graduate Researcher**
 | IRIS Lab, SungKyunKwan University (SKKU)
 2020 (Alternative military service, Mar. 2023 – Mar. 2026)
 Research focuses on efficient machine learning across domains:
- **Neural Rendering**
 3D Gaussian Splatting [C7,C9,C11,C13,J4], Neural Radiance Field [C4,C6]
 - **Neural Field Architecture**
 General neural field [C6], Video representation [C5]
 - **Vision Applications**
 Object detection [C1], Image compression [C12,J1], Anomaly detection [C8]
 - **System-Aware Neural Networks**
 Flexible-precision weight neural networks [C10], Edge-cloud collaborative neural networks [C2,J2]

SELECTED PUBLICATIONS

- C11 **Optimized Minimal 3D Gaussian Splatting**
 Joo Chan Lee, Jong Hwan Ko, Eunbyung Park
NeurIPS, 2025 [Page][Paper][Code]
- C8 **Continuous Memory Representation for Anomaly Detection**
 Joo Chan Lee*, Taejune Kim*, Eunbyung Park, Simon S. Woo, Jong Hwan Ko
ECCV, 2024 [Page][Paper][Code]
- J4 **Compact 3D Gaussian Splatting for Static and Dynamic Radiance Fields**
 Joo Chan Lee, Daniel Rho, Xiangyu Sun, Jong Hwan Ko, Eunbyung Park
Preprint (In major revision for TPAMI), 2024 [Page][Paper][Code]
- C7 **Compact 3D Gaussian Representation for Radiance Field**
 Joo Chan Lee, Daniel Rho, Xiangyu Sun, Jong Hwan Ko, Eunbyung Park
CVPR, 2024 (Highlight) [Page][Paper][Code]
- C6 **Coordinate-Aware Modulation for Neural Fields**
 Joo Chan Lee, Daniel Rho, Seungtae Nam, Jong Hwan Ko, Eunbyung Park
ICLR, 2024 (Spotlight) [Page][Paper][Code]
- C5 **FFNeRV: Flow-Guided Frame-Wise Neural Representations for Videos**
 Joo Chan Lee, Daniel Rho, Jong Hwan Ko, Eunbyung Park
ACM MM, 2023 [Page][Paper][Code]
- C4 **Masked Wavelet Representation for Compact Neural Radiance Fields**
 Daniel Rho*, Byeonghyeon Lee*, Seungtae Nam, Joo Chan Lee, Jong Hwan Ko, Eunbyung Park
CVPR, 2023 [Page][Paper][Code]

HONORS & AWARDS

- 2026 **Encouragement Prize (KRW 2,000,000)** – 32nd Samsung Humantech Paper Award (Computer Science & Engineering) Optimized Minimal 3D Gaussian Splatting [C11](#)
- 2025 **Top Reviewer** – Conference on Neural Information Processing Systems (NeurIPS)
- 2025 **Doctoral Colloquium** – Korean Conference on Computer Vision (KCCV)
Selected among the outstanding 8 Ph.D. researchers in Computer Vision in Korea
- 2024 **President's Award** – Korea Institute of Energy Technology Evaluation and Planning (KETEP)
- 2022 **Outstanding Research Award** – Dept. of Artificial Intelligence, SungKyunKwan University
- 2025 Awarded KRW 700,000 (2022), 1,000,000 (2024), 1,500,000 (2025)
- 2022 **Scholarship for Outstanding PhD Candidates** – Dept. of Artificial Intelligence, SungKyunKwan University
Awarded KRW 5,000,000
- 2020 **2nd Place Winner of Artificial Intelligence Grand Challenge** – Institute of Information & Communications Technology Planning & Evaluation, Korea
- 2020 **1st Place Winner of the Object Detection Track** – VisDrone (ECCV 2020 Workshop) Challenge

INTELLECTUAL PROPERTIES

PROJECTS

- Now **Lightweighting Dynamic Neural Radiance Fields**
| Electronics and Telecommunications Research Institute (ETRI)
- 2023 • Deployed compact neural radiance fields for dynamic scenes. [J4](#)
- Now **High-Performance Industrial Anomaly Detection**
| SEMES
- 2023 • Deployed high-performance anomaly detection model for industrial images. [C8](#)
- 2022 **Object Detection System for UAVs**
| Korea Aerospace Research Institute (KARI)
- 2020 • Deployed edge-cloud neural network system for high-performance object detection in aerial imagery. [C1](#)

PATENTS

- P10 **Joo Chan Lee** and Jong Hwan Ko, **US Patent Registration** No.12,488,583 (KR Patent Application No.10-2022-0059423), Deep Neural Network-Based Object Detection Method, and Cloud Server and Edge Device Performing Deep Neural Network-Based Object Detection Method, Dec. 2025.
- P9 **Joo Chan Lee** and Jong Hwan Ko, **US Patent Registration** No.12,423,966 (KR Patent Application No.10-2022-0066704, Allowed), Deep Neural Network-Based Real-Time Inference Method, and Cloud Device and Edge Device Performing Deep Neural Network-Based Real-Time Inference Method, Sep. 2025.
- P8 **Joo Chan Lee**, Daniel Rho, Jong Hwan Ko, and Eunbyung Park, **KR Patent Registration** No.10-2803669, Method and Apparatus for Representing Frame of Video Using Deep Learning Model, Apr. 2025.
- P7 Chanung Park, **Joo Chan Lee**, and Jong Hwan Ko, KR Patent Application No.10-2025-0194241, Computing Apparatus for Image Compression and Restoration, Method for Training an Artificial Neural Network Therefor, and Image Restoration Method Thereof, Dec. 2025.
- P6 **Joo Chan Lee**, Daniel Rho, Xiangyu Sun, Jun Young Jeong, Gwangsoon Lee, Jong Hwan Ko, and Eunbyung Park, US Patent Application No. 19/395,872 (KR Patent Application No.10-2024-0167744), Method and Computing Device for Compressed 3D Gaussian Splatting, and Computer-Readable Recording Medium Thereof, Nov. 2025.
- P5 Yeoncheol Song, Jihun Yoo, Gwangseop Kim, Jong Hwan Ko, **Joo Chan Lee**, Jiseok Kim, KR Patent Application No.10-2025-0108581, Method for Anomalous Image Generation and Non-Transitory Computer-Readable Medium Therefor, Aug. 2025.
- P4 Xiangyu Sun, **Joo Chan Lee**, Jong Hwan Ko, and Eunbyung Park, KR Patent Application No.10-2024-0177514, Method of Processing Coordinates and Attributes of Point and Apparatus Thereof, Dec. 2024.
- P3 **Joo Chan Lee**, Taejune Kim, Eunbyung Park, Simon S. Woo, and Jong Hwan Ko, PCT International Application No. PCT/KR2024/017582 (KR Patent Application No.10-2023-0195695), Anomaly Detection Method and Apparatus, and Learning Method Thereof, Nov. 2024.
- P2 Johnny Rhe, Kang Eun Jeon, **Joo Chan Lee**, Seongmoon Jeong, and Jong Hwan Ko, PCT International Application No.PCT/KR2024/016234 (KR Patent Application No.10-2023-0171519), Method and apparatus for convolution operation utilizing kernel shape control, Oct. 2024.
- P1 Daniel Rho, Byeonghyeon Lee, Seungtae Nam, **Joo Chan Lee**, Jong Hwan Ko, and Eunbyung Park, KR Patent Application No.10-2023-0183124, Method and Apparatus for 2D Image Generation Based on Neural Radiance Fields Model, Dec. 2023.

FULL PUBLICATIONS

CONFERENCE

- C13 **Optimized Minimal 4D Gaussian Splatting**
Minseo Lee, Byeonghyeon Lee, Lucas Yunkyu Lee, Eunsoo Lee, Sangmin Kim, Seunghyeon Song, **Joo Chan Lee**, Jong Hwan Ko, Jaesik Park, Eunbyung Park
Preprint, 2025 [[Page](#)][[Paper](#)][[Code](#)]
- C12 **Single-step Diffusion for Image Compression at Ultra-Low Bitrates**
Chanung Park, **Joo Chan Lee**, Jong Hwan Ko
WACV, 2026 [[Paper](#)]
- C11 **Optimized Minimal 3D Gaussian Splatting**
Joo Chan Lee, Jong Hwan Ko, Eunbyung Park
NeurIPS, 2025 [[Page](#)][[Paper](#)][[Code](#)]
- C10 **TruncQuant: Truncation-Ready Quantization for DNNs with Flexible Weight Bit Precision**
Jin Hee Kim, Seoyeon Yoon, Taeho Lee, **Joo Chan Lee**, Kang Eun Jeon, Jong Hwan Ko
ISLPED, 2025 [[Paper](#)][[Code](#)]
- C9 **F-3DGS: Factorized Coordinates and Representations for 3D Gaussian Splatting**
Xiangyu Sun, **Joo Chan Lee**, Daniel Rho, Jong Hwan Ko, Usman Ali, Eunbyung Park
ACM MM, 2024 [[Page](#)][[Paper](#)][[Code](#)]
- C8 **Continuous Memory Representation for Anomaly Detection**
Joo Chan Lee*, Taejune Kim*, Eunbyung Park, Simon S. Woo, Jong Hwan Ko
ECCV, 2024 [[Page](#)][[Paper](#)][[Code](#)]
- C7 **Compact 3D Gaussian Representation for Radiance Field**
Joo Chan Lee, Daniel Rho, Xiangyu Sun, Jong Hwan Ko, Eunbyung Park
CVPR, 2024 ([Highlight](#)) [[Page](#)][[Paper](#)][[Code](#)]
- C6 **Coordinate-Aware Modulation for Neural Fields**
Joo Chan Lee, Daniel Rho, Seungtae Nam, Jong Hwan Ko, Eunbyung Park
ICLR, 2024 ([Spotlight](#)) [[Page](#)][[Paper](#)][[Code](#)]
- C5 **FFNeRV: Flow-Guided Frame-Wise Neural Representations for Videos**
Joo Chan Lee, Daniel Rho, Jong Hwan Ko, Eunbyung Park
ACM MM, 2023 [[Page](#)][[Paper](#)][[Code](#)]
- C4 **Masked Wavelet Representation for Compact Neural Radiance Fields**
Daniel Rho*, Byeonghyeon Lee*, Seungtae Nam, **Joo Chan Lee**, Jong Hwan Ko, Eunbyung Park
CVPR, 2023 [[Page](#)][[Paper](#)][[Code](#)]
- C3 **Kernel Shape Control for Row-Efficient Convolution on Processing-In-Memory Arrays**
Johnny Rhe, Kang Eun Jeon, **Joo Chan Lee**, Seongmoon Jeong, Jong Hwan Ko
ICCAD, 2023 [[Paper](#)][[Code](#)]
- C2 **A Splittable DNN-Based Object Detector for Edge-Cloud Collaborative Real-Time Video Inference**
Joo Chan Lee, Yongwoo Kim, SungTae Moon, Jong Hwan Ko
AVSS, 2021 [[Paper](#)]
- C1 **VisDrone-DET2020: The Vision Meets Drone Object Detection in Image Challenge Results**
..., **Joo Chan Lee**, ... (Challenge Participants)
ECCV Workshops, 2020 [[Paper](#)][[Certificate](#)]

JOURNAL

- J4 **Compact 3D Gaussian Splatting for Static and Dynamic Radiance Fields**
Joo Chan Lee, Daniel Rho, Xiangyu Sun, Jong Hwan Ko, Eunbyung Park
Preprint (In major revision for TPAMI), 2024 [[Page](#)][[Paper](#)][[Code](#)]
- J3 **KERNTR0L: Kernel Shape Control Toward Ultimate Memory Utilization for In-Memory Convolutional Weight Mapping**
Johnny Rhe, Kang Eun Jeon, **Joo Chan Lee**, Seongmoon Jeong, Jong Hwan Ko
IEEE TCAS-I, 2024 [[Paper](#)][[Code](#)]
- J2 **A Reconfigurable Neural Architecture for Edge-Cloud Collaborative Real-Time Object Detection**
Joo Chan Lee, Yongwoo Kim, SungTae Moon, Jong Hwan Ko
IEEE Internet of Things Journal, 2022 [[Paper](#)]
- J1 **Scalable Color Quantization for Task-Centric Image Compression**
Jae Hyun Park, Sang Hoon Kim, **Joo Chan Lee**, Jong Hwan Ko
ACM TOMM, 2022 [[Paper](#)]

PROFESSIONAL SERVICES

CONFERENCE PAPER REVIEWS

- Special Interest Group on Computer Graphics and Interactive Techniques (SIGGRAPH)
- Conference on Neural Information Processing Systems (NeurIPS)
- Conference on Computer Vision and Pattern Recognition (CVPR)
- International Conference on Computer Vision (ICCV)
- AAAI Conference on Artificial Intelligence (AAAI)
- Pacific Graphics (PG)
- British Machine Vision Conference (BMVC)
- IEEE International Conference on Advanced Visual and Signal-Based Systems (AVSS)
- Design Automation Conference (DAC)

JOURNAL PAPER REVIEWS

- IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)
- Computer Vision and Image Understanding (CVIU)

STUDENT MENTORING

2025 – **Seunghyeon Song** – *Ph.D. Student at SungKyunKwan University*

- 3D Gaussian Splatting for dynamic scene representation

2024 – **Chanung Park** – *Ph.D. Student at SungKyunKwan University*

- Diffusion models for image compression at ultra low bitrate [C12](#)

2023 **Taejune Kim** – *M.S. Student at SungKyunKwan University, now at Robotics Lab, Hyundai Motor Company*

- Anomaly detection using neural representation [C8](#)

SKILLS

Programming Languages: Python, C/C++, Matlab

Learning Frameworks: Pytorch, Jax, Tensorflow

REFERENCES

Jong Hwan Ko (*Ph.D. advisor*)

Associate Professor

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SungKyunKwan University, Suwon, Korea

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