

# Seunghyeon Seo

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## EDUCATION

Seoul National University, Seoul, Korea	Mar. 2021 ~ Aug. 2025
- Ph.D. in Artificial Intelligence	
Seoul National University, Seoul, Korea	Mar. 2014 ~ Feb. 2021
- B.A. in Agricultural Economics / Data Sciences	
Institut d'Études Politiques de Paris (Sciences Po), Paris, France	Jan. 2019 ~ Jun. 2019
- Exchange Student Program	

## RESEARCH INTERESTS

I am deeply engaged in developing efficient deep learning models for training and inference, aimed at practical real-world applications. Primarily, my research interest focuses on **improving the performance of NeRF and Gaussian Splatting given sparse input data** by various regularization methods, such as exploiting input data distribution, augmenting training rays, designing an effective ray parameterization, etc. In addition, I have recently developed a growing interest in **synthetic data training using generative models**, which further enhances my research focus on data efficiency and model robustness. Beyond these topics, I also maintain a broad curiosity and open-mindedness toward diverse areas of CV/ML/NLP.

## PUBLICATIONS

- [1] Shaojie Bai\*, **Seunghyeon Seo\***, Yida Wang, Chenghui Li, Owen Wang, Te-Li Wang, Tianyang Ma, Jason Saragih, Shih-En Wei, Nojun Kwak, Hyung Jun Kim, [“Generative Head-Mounted Camera Captures for Photorealistic Avatars”](#), *SIGGRAPH Asia 2025*. **(Journal Track)**
- [2] Yeonjin Chang, Erqun Dong, **Seunghyeon Seo**, Nojun Kwak, Kwang Moo Yi, [“ROODI: Reconstructing Occluded Objects with Denoising Inpainters”](#), Under Review.
- [3] Ingyun Lee, Jae Won Jang, **Seunghyeon Seo**, Nojun Kwak, [“DivCon-NeRF: Generating Augmented Rays with Diversity and Consistency for Few-shot View Synthesis”](#), Under Review.
- [4] **Seunghyeon Seo**, Yeonjin Chang, Jayeon Yoo, Seungwoo Lee, Hojun Lee, Nojun Kwak, [“ARC-NeRF: Area Ray Casting for Broader Unseen View Coverage in Few-shot Object Rendering”](#), *CVPR 2025 Workshop*. **(Oral)**
- [5] Donghoon Han\*, **Seunghyeon Seo\***, Eunhwan Park, SeongUk Nam, Nojun Kwak, [“Unleash the Potential of CLIP for Video Highlight Detection”](#), \* indicates equal contribution, *CVPR 2024 Workshop*.
- [6] Yeonjin Chang, Yearim Kim, **Seunghyeon Seo**, Jung Yi, Nojun Kwak, [“Fast Sun-aligned Outdoor Scene Relighting based on TensoRF”](#), *WACV 2024*.
- [7] Donghoon Han, **Seunghyeon Seo**, DongHyeon Jeon, Jiho Jang, Chaerin Kong, Nojun Kwak, [“ConcatPlexer: Additional Dim1 Batching for Faster ViTs”](#), *NeurIPS 2023 Workshop*. **(Oral)**
- [8] **Seunghyeon Seo**, Yeonjin Chang, Nojun Kwak, [“FlipNeRF: Flipped Reflection Rays for Few-shot Novel View Synthesis”](#), *ICCV 2023*.
- [9] **Seunghyeon Seo**, Jaeyoung Yoo, Jihye Hwang, Nojun Kwak, [“MDPose: Real-Time Multi-Person Pose Estimation via Mixture Density Model”](#), *UAI 2023*.
- [10] Jaeyoung Yoo\*, Hojun Lee\*, **Seunghyeon Seo**, Inseop Chung, Nojun Kwak, [“End-to-End Multi-Object Detection with a Regularized Mixture Model”](#), \* indicates equal contribution, *ICML 2023*.
- [11] **Seunghyeon Seo**, Donghoon Han\*, Yeonjin Chang\*, Nojun Kwak, [“MixNeRF: Modeling a Ray with Mixture Density for Novel View Synthesis from Sparse Inputs”](#), \* indicates equal contribution, *CVPR 2023*. **(Qualcomm Innovation Fellowship Korea 2023 Winner)**
- [12] Jongmok Kim, Jooyoung Jang, **Seunghyeon Seo**, Jisoo Jeong, Jongkeun Na, Nojun Kwak, [“MUM: Mix Image Tiles and UnMix Feature Tiles for Semi-Supervised Object Detection”](#), *CVPR 2022*.
- [13] Kyuewang Lee\*, Inseop Chung\*, Daeho Um, Jaeseok Choi, Yeji Song, **Seunghyeon Seo**, Nojun Kwak, Jin Young Choi, “Multi-modal Object Detection, Tracking, and Action Classification for Unmanned Outdoor Surveillance Robots”, *ICCAS 2021*.

## WORK EXPERIENCE

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### Meta Reality Labs, Burlingame, CA | *Research Scientist Intern*

May 2025 ~ Aug. 2025

- XRCIA, Datasets (Mentors: John Kim, Lei Xiao, Beibei Liu)
- Research about synthetic egocentric data generation with high-quality body extremities using video diffusion transformer models.
- Leveraged Wan 2.1 video diffusion model with LoRA fine-tuning to adapt generative outputs for egocentric perspectives.

### Meta Reality Labs, Burlingame, CA | *Research Scientist Intern*

Jul. 2024 ~ Jan. 2025

- XRCIA, Datasets (Mentors: John Kim, Shaojie Bai, Tianyang Ma)
- Research about synthetic data generation using conditional multi-view diffusion models, and training framework of universal face encoder leveraging real+synthetic data.
- Successfully reduced the cost of data collection by over an order of magnitude compared to traditional real-world capture workflows.
- Built a high-quality synthetic dataset used alongside real data to train a universal face encoder, resulting in over 5% improvement on key metrics, surpassing the current best model.

### ThinkforBL Consulting Group, Seoul, Korea | *Laboratory Assistant Researcher*

Jun. 2020 ~ Nov. 2020

- Development of deep learning-based solutions for agriculture, addressing diverse client requests and implementing models, e.g., posture detection in sows, crop weight classification, and recommendation systems.

### Food and Agriculture Organization of the United Nations (FAO), Rome, Italy | *Intern*

Sep. 2019 ~ Feb. 2020

- Committee on World Food Security (CFS) (Supervisor: Christopher Hegadorn)
- Research and report on datasets that are relevant to the proposed CFS workstream on <Data Collection and Analysis Tools>.

## PROJECTS

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### Research on Novel View Synthesis Using NeRF Trained with Sparse Viewpoint Data

*Funded by Samsung Electronics | Main Researcher*

Jul. 2023 ~ Jul. 2024

- Neural rendering, NeRF, Few-shot learning
- Conducted research to improve the performance of NeRF under sparse input conditions, resulting in a published research paper at a top-tier computer vision conference.

### Artificial Intelligence Research about Cross-Modal Dialogue Modeling for One-on-One Multi-Modal Interactions

*Funded by Ministry of Science and ICT of Korea | Assistant Researcher*

May 2022 ~ Jun. 2023

- Multi-modal learning, Object detection
- Assisted in building an object detection system that processes user-submitted images to identify clothing items and extract key attributes.

### Development of Real-Time Multi-Camera Object Tracking and Identification Technology

*Funded by Electronics and Telecommunications Research Institute | Project Manager*

Jun. 2021 ~ Dec. 2021

- Multi-object tracking
- Developed a multi-view, multi-object tracking algorithm for real-time vehicle and pedestrian tracking within a parking lot environment.

### Development of Multimodal Sensor-Based Intelligent Systems for Outdoor Surveillance Robots

*Funded by Ministry of Science and ICT of Korea | Assistant Researcher*

Jan. 2021 ~ Aug. 2021

- Multi-modal learning, Object detection
- Contributed to a research project on multi-modal object detection, tracking, and action classification for autonomous outdoor surveillance robots.

## TALK

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### Enhancing Few-shot Novel View Synthesis with Different Ray Processing Strategies in NeRF

Jul. 2025

- Meta Reality Labs

### Generative Head-Mounted Camera Captures for Photorealistic Avatars

Jun. 2025

- Meta Reality Labs

### Novel View Synthesis from Sparse Inputs via NeRF

Apr. 2025

- SNU Haedong Advanced Engineering

## **ACADEMIC SERVICE**

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**Program Committee** for AAAI 2025~2026

**Reviewer** for CVPR 2023~2025, ECCV 2024, ICCV 2025, NeurIPS 2025, TCSVT

## **AWARDS AND SCHOLARSHIPS**

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<b>Outstanding Dissertation Award</b>	Aug. 2025
- Seoul National University	
<b>Outstanding Reviewer Award</b>	Sep. 2024
- ECCV 2024	
<b>Qualcomm Innovation Fellowship Korea 2023 Winner</b>	Nov. 2023
- Qualcomm AI Research	
<b>Youlchon AI Star Scholarship</b>	Aug. 2023
- Youlchon Foundation & AI Institute-Seoul National University	
<b>AI Fellowship (Fully Funded)</b>	Mar. 2022 ~ Feb. 2023
- Seoul National University	
<b>Overseas Agriculture Sector Intern Scholarship</b>	Sep. 2019 ~ Dec. 2019
- Ministry of Agriculture, Food and Rural Affairs	
<b>Exchange Student Scholarship</b>	Jan. 2019
- Mirae Asset Park Hyeon Joo Foundation	
<b>3<sup>rd</sup> Place as a Team, Agdata Lab (Service Development Field)</b>	Sep. 2018
- Entrepreneurship Competition Utilizing Agricultural Data / EPIS	

## **PATENT**

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Method and Apparatus based on NeRF using Flipped Reflected Ray, Korean Patent, 10-2024-0022118

## **SKILLS**

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### **Programming Languages**

- Python, R, CUDA

### **ML Development Stack**

- PyTorch, Jax, Tensorflow, Slurm, MAST Scheduler

### **Language**

- English (Professional), Korean (Native), French (Basic)