

Sanghyun Jo

Principal AI Researcher, OGQ · Affiliated Researcher, SNU AIBL

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Research Highlights

Peer-Reviewed Conference Papers *12 total • **9 as (co-)first author (2 also co-corresponding)** • 3 as co-author*

- **2026** (6): ICLR **(Oral, Top 1.13%)** *(co-first)*, ACCV **(Oral)** *(first author; also Spotlight Presentation at NeurIPS 2026 Workshop ASCI)*, ICML *(co-author)*, ECCV ×2 *(co-first & co-corresponding)*, MICCAI *(co-author)*
- **2025** (2): ICCV *(co-first)*, ICCV *(co-author)*
- **2024** (2): ECCV *(first author)*, ECCV *(co-first)*
- **2023** (1): ICCV *(first author)*
- **2021** (1): ICIP *(first author)*

Papers Under Review *5 total • **2 as (co-)first author (1 also co-corresponding)** • 2 as co-corresponding author • 1 as co-author*

Academic Service *11 conferences • 2 journals • continuous since 2022*

- **Outstanding Reviewer, CVPR 2025** (top 5.6% of 12,593 reviewers)
- Reviewer for NeurIPS, ICLR, ICML, AAAI, CVPR, ICCV, ECCV, and IJCV

Patents & Industry Experience

- 9 years of industrial AI R&D at **OGQ** (2017 – Present), currently **Principal AI Researcher**
- 5 registered and 22 filed Korean patents, including two from the **Seoul National University R&DB Foundation** (2026)

Biography

My research works toward **Physical AI**: vision systems that perceive the physical world, let people interact with what is perceived, and remain deployable under real-world constraints. I pursue three connected axes, treating them not as separate topics but as the perception, generation, and deployment layers of a single pipeline: **segmentation, extending from images to video and 3D**; **interactive segmentation and editing**; and **multimodal distillation and quantization**. Across all three, my approach is to exploit the implicit knowledge already embedded in large-scale foundation models, using generative priors and lightweight interaction to remove the annotation and optimization burdens that make vision systems expensive to build and maintain.

I have been with **OGQ** since 2017, currently serving as the **Principal AI Researcher** and leading industrial AI research and development to maximize tangible real-world impact. In parallel, I have pursued my research under the guidance of **Prof. Kyungsu Kim** since 2021; following his appointment at Seoul National University, I joined the **SNU AIBL Lab** as an **Affiliated Researcher** in September 2024, where I mentor graduate and undergraduate researchers and lead core projects as a co-corresponding author. Integrating industrial R&D leadership with academic rigor, I aim to develop machine learning systems that are both scientifically grounded and practically deployable.

Research Interests

*Toward **Physical AI**: perception, interaction, and efficient deployment of vision systems*

- Core & Biomedical Vision AI *2025 – Present*
- Multimodal Distillation & Quantization *2025 – Present*
- Interactive Segmentation & Editing *2023 – Present*
- Image, Video & 3D Perception *2021 – Present*

Appointments

Principal AI Researcher Jul. 2017 – Present
OGQ (Acquired GYN in 2022), Seoul, Korea

Affiliated Researcher Sep. 2024 – Present
SNU AIBL Lab (Adviser: Prof. Kyungsu Kim), Seoul National University, Korea

Education

B.S., Computer Science Feb. 2026
National Institute for Lifelong Education, Seoul, Korea
Degree conferred by the Minister of Education via the Bachelor's Degree Examination for Self-Education.

Publications: Conference Papers

12 peer-reviewed papers: 9 as (co-)first author (2 also co-corresponding), 3 as co-author. Venues: ICLR (1 Oral, Top 1.13%), ACCV (1 Oral), ICML (1), ECCV (4), ICCV (3), MICCAI (1), ICIP (1).

[**C1**] **Sanghyun Jo**[*], Ziseok Lee[*], Wooyeol Lee, Jonghyun Choi, Jaesik Park[†], Kyungsu Kim[†].
"TRACE: Your Diffusion Model is Secretly an Instance Edge Detector"
ICLR 2026 *[Oral, Top 1.13% (223 papers selected out of 19,735 submissions)]*.
(2026 Google h5-index: 362, Google Top Publication Rank 2nd for Artificial Intelligence).
PDF OpenReview Code Project **[Sanghyun Jo: The co-first author[*]]**

[**C2**] **Sanghyun Jo**, Seo Jin Lee, Seohyung Hong, Yoorim Gang, Hyeongsub Kim, Hyungseok Seo[†], Kyungsu Kim[†].
"One Click per Cell Type Suffices: Training-free Group Interaction for Cell Instance Segmentation"
ACCV 2026 *[Oral]*; also selected for *[Spotlight Presentation, Top-10]* at **NeurIPS 2026 Workshop ASCI** (non-archival).
(2026 Google h5-index: 52, Google Top Publication Rank 17th for Computer Vision).
PDF Code Project **[Sanghyun Jo: The first author]**

[**C3**] Ziseok Lee[*†], Minyeong Hwang[*], Wooyeol Lee, **Sanghyun Jo**, Jihyung Ko, Young Bin Park, Jae-Mun Choi, Eunho Yang[†], Kyungsu Kim[†]. "On the Collapse of Generative Paths: A Criterion and Correction for Diffusion Steering"
ICML 2026 *[Acceptance Rate: 26.6% (6,352 accepted out of 23,918 submissions)]*.
(2026 Google h5-index: 272, Google Top Publication Rank 3rd for Artificial Intelligence).
PDF OpenReview Code Project **[Sanghyun Jo: The co-author]**

[**C4**] **Sanghyun Jo**[*†], Wooyeol Lee[*], Ziseok Lee[*], Jonghyun Choi, Jaesik Park, Kyungsu Kim[†].
"ISAC: Training-Free Instance-to-Semantic Attention Control for Multi-Instance Generation"
ECCV 2026 *[Acceptance Rate: 27.5% (2,883 accepted out of 10,473 submissions)]*.
(2026 Google h5-index: 262, Google Top Publication Rank 2nd for Computer Vision).
PDF Code Project **[Sanghyun Jo: The co-first[*] & co-corresponding[†]]**

[**C5**] **Sanghyun Jo**[*†], Donghwan Lee[*], Eunji Jung[*], Seong Je Oh, Kyungsu Kim[†]. "EraseLoRA: MLLM-Driven Foreground Exclusion and Background Subtype Aggregation for Dataset-Free Object Removal"
ECCV 2026 *[Acceptance Rate: 27.5% (2,883 accepted out of 10,473 submissions)]*.
(2026 Google h5-index: 262, Google Top Publication Rank 2nd for Computer Vision).
PDF Code Project **[Sanghyun Jo: The co-first[*] & co-corresponding[†]]**

[**C6**] Hyeongsub Kim, Sihyun Kim, Minyoung Cho, **Sanghyun Jo**, Minhyeong Lee, Kyungsu Kim[†].
"GeneRAG: A Retrieval-Augmented Framework for Spatially Resolved Gene Expression Prediction"
MICCAI 2026 *[Acceptance Rate: 26.3% (1,211 accepted out of 4,601 submissions)]*.
(2026 Google h5-index: 98, Google Top Publication Rank 4th for Medical Imaging).
PDF Code Project **[Sanghyun Jo: The co-author]**

[**C7**] **Sanghyun Jo**[*], Seo Jin Lee[*], Seungwoo Lee, Seohyung Hong, Hyungseok Seo[†], Kyungsu Kim[†].
"COIN: Confidence Score-Guided Distillation for Annotation-Free Cell Segmentation"
ICCV 2025 *[Acceptance Rate: 24.0% (2,698 accepted out of 11,239 submissions)]*.
(2026 Google h5-index: 256, Google Top Publication Rank 3rd for Computer Vision).
PDF Code Project **[Sanghyun Jo: The co-first author[*]]**

[**C8**] Joowon Kim[*], Ziseok Lee[*], Donghyeon Cho, **Sanghyun Jo**, Yeonsung Jung, Kyungsu Kim[†], Eunho Yang[†].
"Early Timestep Zero-Shot Candidate Selection for Instruction-Guided Image Editing"
ICCV 2025 *[Acceptance Rate: 24.0% (2,698 accepted out of 11,239 submissions)]*.
(2026 Google h5-index: 256, Google Top Publication Rank 3rd for Computer Vision).
PDF Code Project **[Sanghyun Jo: The co-author]**

[C9] **Sanghyun Jo**, Fei Pan, In-Jae Yu, Kyungsu Kim†. "DHR: Dual Features-Driven Hierarchical Rebalancing in Inter- and Intra-Class Regions for Weakly-Supervised Semantic Segmentation"
ECCV 2024 *[Acceptance Rate: 27.9% (2,395 accepted out of 8,585 submissions)]*.
(2026 Google h5-index: 262, Google Top Publication Rank 2nd for Computer Vision).
PDF Code **[Sanghyun Jo: The first author]**

[C10] **Sanghyun Jo***, Soohyun Ryu*, Sungyub Kim, Eunho Yang, Kyungsu Kim†.
"TTD: Text-Tag Self-Distillation Enhancing Image-Text Alignment in CLIP to Alleviate Single Tag Bias"
ECCV 2024 *[Acceptance Rate: 27.9% (2,395 accepted out of 8,585 submissions)]*.
(2026 Google h5-index: 262, Google Top Publication Rank 2nd for Computer Vision).
PDF Code **[Sanghyun Jo: The co-first author*]**

[C11] **Sanghyun Jo**, In-Jae Yu, Kyungsu Kim†. "MARS: Model-agnostic Biased Object Removal without Additional Supervision for Weakly-Supervised Semantic Segmentation"
ICCV 2023 *[Acceptance Rate: 26.7% (2,160 accepted out of 8,088 submissions)]*.
(2026 Google h5-index: 256, Google Top Publication Rank 3rd for Computer Vision).
PDF Code **[Sanghyun Jo: The first author]**

[C12] **Sanghyun Jo**, In-Jae Yu†.
"Puzzle-CAM: Improved Localization via Matching Partial and Full Features"
ICIP 2021 *[Acceptance Rate: 45.9% (791 accepted out of 1,722 submissions)]*.
(2026 Google h5-index: 55, Google Top Publication Rank 16th for Computer Vision).
PDF Code **[Sanghyun Jo: The first author]**

Conference Papers Under Review

[U1] **Sanghyun Jo**†, Chae Yeon Lim, Donghwan Lee, Sihyun Kim, Soo Ye Kim, Kyungsu Kim†. "Depth-to-RGB: Repurposing a Frozen Depth Estimator for Geometry-Guided Compositing", *Under Review*.
PDF Project **[Sanghyun Jo: The first & co-corresponding†]**

[U2] Donghwan Lee*, **Sanghyun Jo***, Sihyun Kim, Ziseok Lee, Kyungsu Kim†. "ReState: Noise-Level-Aware State Correction for Training-Free Object Removal in Few-Step Diffusion Models", *Under Review*.
PDF **[Sanghyun Jo: The co-first author*]**

[U3] Sihyun Kim, **Sanghyun Jo**†, Kyungsu Kim†. "Edited Endpoints as Partial Goals for Image-to-Video Generation", *Under Review*.
PDF Project **[Sanghyun Jo: The co-corresponding†]**

[U4] Jihyung Ko*, Eunji Jung*, Hyeongsub Kim, Ziseok Lee, Jae Won Cho, **Sanghyun Jo**†, Kyungsu Kim†. "PatchGate: Narrowing the Verbalization Gap with Intrinsic Object Inventories in Frozen Vision-Language Models", *Under Review*.
PDF **[Sanghyun Jo: The co-corresponding†]**

[U5] Chae Yeon Lim*†, JaeHyeon Woo*, **Sanghyun Jo**, Kyungsu Kim†. "LiftConsensus: Lifting 2D Change Evidence into 3D via Multi-View Spatial Consensus for Retail Change Detection", *Under Review*. **[Sanghyun Jo: The co-author]**

Preprint

[1] **Sanghyun Jo**, In-Jae Yu, Kyungsu Kim†. "RecurSeed and EdgePredictMix: Pseudo-Label Refinement Learning for Weakly Supervised Semantic Segmentation", *arXiv preprint arXiv:2204.06754*.
PDF Code **[Sanghyun Jo: The first author]**

Awards & Honors

- **Outstanding Reviewer, CVPR 2025** Jun. 2025
  Selected as top 5.6% (711 of 12,593 reviewers).

- **1st Place, Legal Judgment Prediction AI Challenge** Jul. 2023
  1st place out of 1,153 participants. Developed case representation and multi-branch modeling for civil court ruling prediction.

- **5th Place, Synthetic Data Object Detection AI Challenge** Jun. 2023
  5th place out of 1,747 participants. Built a robust vehicle detector under domain shift.

Academic Service

Reviewer for **11 international conferences** and **2 journals** since 2022, including NeurIPS, ICLR, ICML, AAAI, CVPR, ICCV, ECCV, and IJCV. Recognized as an **Outstanding Reviewer at CVPR 2025** (top 5.6% of 12,593 reviewers).

- **2027:** ICLR, AAAI
- **2026:** ICLR, NeurIPS, CVPR, ECCV, MICCAI, ACCV
- **2025:** CVPR, ICCV
- **2024:** ICPR, ICIP
- **2023:** ICIP
- **2022:** ICML, ICIP

Journals: IJCV (2024–2026), IEEE TCSVT (2022)

Invited Talks & Presentations

- **Yonsei University**, Seoul, Korea — Jun. 2026
  Vision AI Already Knows: Understanding the World Without Labels
  Slides (EN)

- **ICLR 2026**, Rio de Janeiro, Brazil — Apr. 2026
  TRACE Oral Presentation (Oral Session 5B: Video and Scene Generation)
  Slides (EN) Watch

- **MODULABS**, Seoul, Korea — Dec. 2024
  DHR & TTD Recap: Sharing Our ECCV 2024 Work with Local Researchers
  Watch

- **Yonsei University**, Seoul, Korea — Dec. 2023
  Advanced AI Developments
  Slides (EN)

- **Google Developer Groups (GDG)**, Incheon, Korea — Oct. 2023
  Strategies for Reducing Labeling Costs in Vision AI
  Slides (KR) Watch

- **MODULABS**, Seoul, Korea — Nov. 2022
  Experience Sharing Session: Vision Research
  Slides (KR) Watch

- **MODULABS**, Seoul, Korea — Oct. 2022
  RSEPM Paper Presentation
  Slides (EN) Watch

Patents

5 registered and 22 filed Korean patents covering image segmentation, image editing and synthesis, vision-language and large language models, de-identification, and gene expression prediction; 25 with OGQ as the applicant and 2 with the Seoul National University R&DB Foundation. Titles and inventor order follow the official records, except where noted. Linked titles open the public KIPRIS record; applications without a link are not yet published.

Registered (5)

[**P1**] **Sanghyun Jo**, Kyungsu Kim, Seungon Bang. "Method for Background Composition of Error Object Area Performed on a Computing Device and Computing Device for Performing the Same", **Korean Patent No. 10-3048915**, Nov. 2026 (Application No. 10-2024-0198644, Dec. 2024).

[**P2**] **Sanghyun Jo**, Kyungsu Kim, Seungon Bang. "Dual Feature-Based Image Segmentation Method Performed by a Computing Device and Computing Device for Performing the Same", **Korean Patent No. 10-3036286**, Oct. 2026 (Application No. 10-2024-0171260, Nov. 2024). The filed English title is shared with [**P22**]; the Korean title describes an image retrieval-based inpainting method.

[**P3**] Kyungsu Kim, In-Jae Yu, **Sanghyun Jo**, Seungon Bang. "Method of Acquiring Object Segmentation Information Through Trained Neural Network and Server System Performing the Same Method", **Korean Patent No. 10-2916563**, Jan. 2026 (Application No. 10-2022-0141458, Oct. 2022). Also filed as PCT/KR2023/005062 (WO 2024/090692).

[**P4**] Seungon Bang, **Sanghyun Jo**. "Method for Safety Management by Object Segmentation Based on Deep-Learning and System for the Method", **Korean Patent No. 10-2831465**, Jul. 2025 (Application No. 10-2021-0164131, Nov. 2021).

[**P5**] Kyungsu Kim, In-Jae Yu, **Sanghyun Jo**, Seungon Bang. "Object De-Identification Method Through Segmentation and Server That Performs the Same Method", **Korean Patent No. 10-2769724**, Feb. 2025 (Application No. 10-2023-0164620, Nov. 2023).

Filed (20, OGQ)

[**P6**] Seungon Bang, Kyungsu Kim, **Sanghyun Jo**. "Method for Real-Time Data Retrieval and Question Answering Based on Function Calling", Korean Patent Application No. 10-2026-0059440, Apr. 2026.

[**P7**] Seungon Bang, Kyungsu Kim, **Sanghyun Jo**. "Method for Structuring Unstructured Data and Automatically Storing in Knowledge Graph Based on Large Language Model", Korean Patent Application No. 10-2026-0059432, Apr. 2026.

[**P8**] Seungon Bang, Kyungsu Kim, **Sanghyun Jo**, Seungjun Jo. "Vision Language Model-Based Image Description Generation Method Using Representative-Tag-Based Embedding Alignment and Information Compression", Korean Patent Application No. 10-2025-0212590, Dec. 2025.

[**P9**] Seungon Bang, Kyungsu Kim, **Sanghyun Jo**, Seungjun Jo. "Intelligent Video Security Monitoring Method and System Using Dual-Feature Hierarchical Refinement and Question-Answer-Based Reasoning", Korean Patent Application No. 10-2025-0212568, Dec. 2025.

[**P10**] Seungon Bang, Kyungsu Kim, **Sanghyun Jo**, Seungjun Jo. "Vision-Language Model Based Video Security Monitoring Method Performed by a Computing Device", Korean Patent Application No. 10-2025-0212529, Dec. 2025.

[**P11**] Seungon Bang, Kyungsu Kim, **Sanghyun Jo**, Seungjun Jo. "Segmentation-Based Object Removal and Virtual Advertisement Inpainting System and Method", Korean Patent Application No. 10-2025-0184690, Nov. 2025.

[**P12**] Seungon Bang, Kyungsu Kim, **Sanghyun Jo**, Seungjun Jo. "Method and System for Detecting Erroneous Objects and Extracting Error Frames Based on Tagged Images", Korean Patent Application No. 10-2025-0184673, Nov. 2025.

[**P13**] Seungon Bang, Kyungsu Kim, **Sanghyun Jo**, Seungjun Jo. "Weakly and Unsupervised Learning-Based Image Segmentation Method and System for PPL Compliance Analysis", Korean Patent Application No. 10-2025-0184663, Nov. 2025.

[**P14**] Seungon Bang, Kyungsu Kim, **Sanghyun Jo**, Seungjun Jo. "Method and System for Generating Advertising Images Using Instruction-Driven Diffusion Models With Early Seed Selection and Interface-Based User Input", Korean Patent Application No. 10-2025-0184639, Nov. 2025.

[**P15**] Seungon Bang, Kyungsu Kim, **Sanghyun Jo**, Seungjun Jo. "News Breaking Thumbnail and Video Generation System Using Representative-Tag-Based Object and Background Recommendation", Korean Patent Application No. 10-2025-0184621, Nov. 2025.

[**P16**] Seungon Bang, Kyungsu Kim, **Sanghyun Jo**. "Confidence Score-Guided Self-Distillation Method for Annotation-Free Instance Segmentation", Korean Patent Application No. 10-2025-0162415, Oct. 2025.

[**P17**] Seungon Bang, Kyungsu Kim, **Sanghyun Jo**. "Instruction-Guided Image Editing Method Using Early-Stopped Background Inconsistency Score Evaluation", Korean Patent Application No. 10-2025-0162189, Oct. 2025.

[**P18**] Seungon Bang, Kyungsu Kim, **Sanghyun Jo**. "Instance-Aware Edge Map Generation Without Pixel Annotations Using a Diffusion Model and Segmentation Mask Refinement Method Based Thereon", Korean Patent Application No. 10-2025-0162165, Oct. 2025.

[**P19**] Kyungsu Kim, In-Jae Yu, **Sanghyun Jo**, Seungon Bang. "Object De-Identification Method Through Segmentation and Server That Performs the Same Method", Korean Patent Application No. 10-2025-0018458, Feb. 2025 (divisional of [**P5**]).

[**P20**] **Sanghyun Jo**, Kyungsu Kim, Seungon Bang. "Method for Synthesizing Virtual Objects for Virtual Advertising Performed by a Computing Device and Computing Device for Performing the Same", Korean Patent Application No. 10-2024-0198877, Dec. 2024.

[**P21**] **Sanghyun Jo**, Kyungsu Kim, Seungon Bang. "Dual Feature-Based Image Segmentation Method Performed by a Computing Device and Computing Device for Performing the Same", Korean Patent Application No. 10-2024-0171236, Nov. 2024. The filed English title is shared with [**P22**]; the Korean title describes an image segmentation method using tag-based activation maps.

[**P22**] **Sanghyun Jo**, Kyungsu Kim, Seungon Bang. "Dual Feature-Based Image Segmentation Method Performed by a Computing Device and Computing Device for Performing the Same", Korean Patent Application No. 10-2024-0171211, Nov. 2024.

[**P23**] **Sanghyun Jo**, Kyungsu Kim, Seungon Bang. "Method for Image Tagging Based on Image Matching Performed by a Computing Device and Computing Device for Performing the Same", Korean Patent Application No. 10-2024-0171187, Nov. 2024.

[**P24**] Kyungsu Kim, In-Jae Yu, **Sanghyun Jo**, Seungon Bang. "Debiased Segmentation Method and Server That Performs the Same Method", Korean Patent Application No. 10-2023-0164587, Nov. 2023.

[**P25**] Kyungsu Kim, In-Jae Yu, **Sanghyun Jo**, Seungon Bang. "Obtaining Method of Object Mask Information for Public Safety and Server System Performing the Same", Korean Patent Application No. 10-2022-0176164, Dec. 2022.

Filed (2, Seoul National University R&DB Foundation)

[**P26**] Kyungsu Kim, Jihyung Ko, Eunji Jung, **Sanghyun Jo**, Hyeongsub Kim, Ziseok Lee. "Apparatus and Method for Mitigating Object Hallucination of Vision-Language Models for Images", Korean Patent Application No. 10-2026-0204604, Oct. 2026, based on the PatchGate paper [**U4**].

[**P27**] Hyeongsub Kim, Sihyun Kim, Minyoung Cho, **Sanghyun Jo**, Minhyeong Lee, Kyungsu Kim. Korean Patent Application No. 10-2026-0138802, Jul. 2026, based on the GeneRAG paper [**C6**]. Inventors are listed in the paper's author order; the filed title and inventor order will be added once confirmed from the filing.