Sujin Jang

Associate Professor, Hanyang University

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Research Interests

My research lies at the intersection of **Machine Learning**, **Computer Vision**, and **Robotics**, with a focus on enabling ***Physical AI Agents*** *to perform complex and diverse tasks in unstructured real-world environments, with the goal of ultimately providing practical benefits to human users*. To achieve this, I have investigated **3D Scene Understanding, Robotic Action Learning, Multi-Modal Representation Learning, Transfer Learning**, and **Human-AI-Robot Interaction**, with applications in **Autonomous Driving** and **Industrial Robotics**.

Employment & Project Summary

Hanyang University ERICA
Ansan, South Korea

Associate Professor @ Dept. of Artificial Intelligence, College of Computing — *Mar 2026 - Current*

- Director of Human-centered Physical Intelligence Lab.
- (Joint Appointment) Department of Robotics, College of Engineering

AI Center (Formerly AI Research Center at SAIT), Samsung Electronics Co.
Suwon, South Korea

Principal Researcher (Task Leader) @ Autonomous Machine Intelligence Team — *Dec 2024 - Feb 2026*

- Lead a *Robot AI* research team developing (1) vision-language-action models for task and motion planning; (2) world models for robotic decision making; (3) learning action skills from videos; (4) sim-to-real domain transfer learning.
- Lead an *Industrial Computer Vision* research team developing AI S/W for automated semiconductor failure diagnostics.
- Collaborate with universities: Korea University, KAIST, Université de Montréal (Mila), Brown University

Samsung Advanced Institute of Technology (SAIT)
Suwon, South Korea

Principal Researcher (Fast-track Promotion) @ Autonomous Driving Team — *Mar 2024 - Dec 2024*

Staff Researcher @ Autonomous Driving Team — *Jun 2020 - Feb 2024*

- Lead an *Autonomous Driving Perception* team developing multi-modal 3D vision systems.
- Lead research on domain transfer, multi-modal representation learning, and world models for physical AI agents.
- Collaborate with universities: Korea University, KAIST, Université de Montréal (Mila)

S.LSI, Samsung Electronics Co.
Hwaseong, South Korea

Staff Researcher @ Autonomous Driving Team — *Jan 2019 - Jun 2020*

- Develop camera-based vision systems for autonomous driving; hardware-aware quantization for efficient DNN inference.

Motorola Mobility LLC. (A Lenovo Company)
Chicago, IL, USA

Machine Learning Staff Researcher @ Device+Machine Learning Team — *Jun 2017 - Dec 2018*

- Develop fast prototypes of machine learning and computer vision algorithms for (1) AR/VR applications, (2) accelerating DNNs for smart mobile devices, and (3) human activity recognition with various wearable sensors.

Education

Purdue University
West Lafayette, IN, USA

Ph.D., Mechanical Engineering — *Aug. 2017*

- Specialization: *Machine Learning, Human-Machine Interaction, Robotics*
- Thesis: *Methods for Analyzing Natural Patterns and Physical Ergonomics of Human Gestures in Mid-Air Interaction*
- Committee members: Karthik Ramani, Niklas Elmqvist, David Ebert, Alexander Quinn, and Jitesh Panchal

University of Florida
Gainesville, FL, USA

M.S., Mechanical Engineering *Aug. 2012*

- Specialization: *Controls, Robotics*
- Thesis: *Experimental Demonstration of Structure Estimation of Moving Objects Using Unknown Input Observers*
- Committee members: Carl D. Crane III, Warren E. Dixon, and Prabir Barooah

Kookmin University
Seoul, South Korea

B.S., Mechanical and Automotive Engineering *Aug. 2010*

- Research intern at Unmanned Vehicle Lab.
- Advisor: Jungha Kim

Publications

(C: Conference, J: Journal, P: Pre-print, *: Co-first Authors, †: (Co-)Corresponding Authors)

[P.5] Han yi Shin*, Heeju Ko*, Jaewon Mun, Qixing Huang, JaeHyeok Lee, Sung June Kim, Honglak Lee, **Sujin Jang**, Sangpil Kim, *"SECOND-Grasp: Semantic Contact-guided Dexterous Grasping"*, Preprint (Under Review)

[P.4] Gyusam Chang, Jeongyoon Yoon, JaeHyeok Lee, **Sujin Jang**, Sangpil Kim, *"RevoNAD: Reflective Evolutionary Exploration for Neural Architecture Design"*, Preprint (Under Review)

[P.3] Lu Xu, Jiaqian Yu, Xiongfeng Peng, Yiwei Chen, Weiming Li, Jaewook Yoo, Sunghyun Chung, **Sujin Jang**, Dongwook Lee, Daehyun Ji, Chao Zhang, *"MoSE: Skill-by-Skill Mixture-of-Experts Learning for Embodied Autonomous Machines"*, Preprint (Under Review)

[P.2] Gyusam Chang, Jiwon Lee, Jinkyu Kim, Dongwook Lee, Daehyun Ji, Wonjeong Ryoo, **Sujin Jang**†, Sangpil Kim†, *"Cross-Modal Domain Generalization for Multi-View 3D Object Detection"*, Preprint (Under Review)

[P.1] Dae Ung Jo*, **Sujin Jang***, Jay Heo, Sung Ju Hwang, *"Mitigating Dimensional Collapse in Cross-Modal Feature Distillation via Information Bottleneck"*, Preprint (Under Review)

[C.14] Xiongfeng Peng, Jiaqian Yu, Yamin Mao, Yi Zhou, Chao Zhang, Weiming Li, **Sujin Jang**, Dongwook Lee, Daehyun Ji, *"DAM-VLA: VLM-based Dynamic Action Model for Robot Manipulation"*, IEEE International Conference on Robotics & Automation (**ICRA**), 2026

[C.13] Heeju Ko, Sungjune Kim, Gyeongrok Oh, Jeongyoon Yoon, Honglak Lee, **Sujin Jang**, Seungryong Kim, Sangpil Kim, *"Active Test-time Vision-Language Navigation"*, Conference on Neural Information Processing Systems (**NeurIPS**, 24.5% acceptance rate), 2025

[C.12] Sungjune Kim*, Gyeongrok Oh*, Heeju Ko, Dongwook Lee, Daehyun Ji, Byungjun Lee, **Sujin Jang**†, Sangpil Kim†, *"Test-Time Adaptation for Online Vision-Language Navigation with Feedback-based Reinforcement Learning"*, International Conference on Machine Learning (**ICML**, 26.9% acceptance rate), 2025

[C.11] Gyeongrok Oh*, Sungjune Kim*, Heeju Ko, Hyung-gun Chi, Jinkyu Kim, Dongwook Lee, Daehyun Ji, Sungjoon Choi, **Sujin Jang**†, Sangpil Kim†, *"3D Occupancy Prediction with Low-Resolution Queries via Prototype-aware View Transformation"*, IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**, 22.1% acceptance rate), 2025

[C.10] Nayeon Kim*, Hongje Seong*, Daehyun Ji, **Sujin Jang**†, *"Unveiling the Hidden: Online Vectorized HD Map Construction with Clip-Level Token Interaction and Propagation"*, Conference on Neural Information Processing Systems (**NeurIPS**, 25.8% acceptance rate), 2024

[C.9] Gyusam Chang*, Jiwon Lee*, Donghyun Kim, Jinkyu Kim, Dongwook Lee, Daehyun Ji, **Sujin Jang**†, Sangpil Kim†, *"Unified Domain Generalization and Adaptation for Multi-View 3D Object Detection"*, Conference on Neural Information Processing Systems (**NeurIPS**, 25.8% acceptance rate), 2024

[C.8] Gyusam Chang*, Wonseok Roh*, **Sujin Jang**, Dongwook Lee, Daehyun Ji, Gyeongrok Oh, Jinsun Park, Jinkyu Kim, Sangpil Kim, *"CMDA: Cross-Modal and Domain Adversarial Adaptation for LiDAR-based 3D Object Detection"*, AAAI Conference on Artificial Intelligence (**AAAI**, 23.7% acceptance rate), 2024

[C.7] **Sujin Jang***, Dae Ung Jo*, Sung Ju Hwang, Dongwook Lee, Daehyun Ji, *"STXD: Structural and Temporal Cross-Modal Distillation for Multi-View 3D Object Detection"*, Conference on Neural Information Processing Systems (**NeurIPS**, 26.1% acceptance rate), 2023

[J.2] Ana Villanueva*, **Sujin Jang***, Wolfgang Stüerzlinger, Satyajit Ambike, Karthik Ramani, *"Advanced Modeling Method for Quantifying Cumulative Subjective Fatigue in Mid-Air Interaction"*, International Journal of Human-Computer

Studies (**IJHCS**), Vol 169, Jan 2023

[C.6] **Sujin Jang**, Joohan Na, Dokwan Oh, *"DaDA: Distortion-aware Domain Adaptation for Unsupervised Semantic Segmentation"*, Conference on Neural Information Processing Systems (**NeurIPS–Oral**, 184/2665 $\sim$ 6.9%), 2022

[C.5] **Sujin Jang**, Wolfgang Stüerzlinger, Satyajit Ambike, Karthik Ramani, *"Modeling Cumulative Arm Fatigue in Mid-Air Interaction based on Perceived Exertion and Kinetics of Arm Motion"*, ACM Conference on Human Factors in Computing Systems (**CHI**, 25% acceptance rate), 2017

[J.1] **Sujin Jang**, Niklas Elmqvist, Karthik Ramani, *"MotionFlow: Visual Abstraction and Aggregation of Sequential Patterns in Human Motion Tracking Data"*, IEEE Transaction on Visualization and Computer Graphics (**TVCG**), vol 22. Jan 31, 2016, Presenteed at IEEE Visual Analytics Science and Technology Conference (**VAST**, 22% acceptance rate) 2015

[C.4] Chiho Choi, Ayan Sinha, Joon Hee Choi, **Sujin Jang**, Karthik Ramani, *"A Collaborative Filtering Approach to Real-Time Hand Pose Estimation"*, IEEE Interactional Conference on Computer Vision (**ICCV**, 30% acceptance rate), 2015

[C.3] **Sujin Jang**, Niklas Elmqvist, Karthik Ramani, *"GestureAnalyzer: Visual Analytics for Pattern Analysis of Mid-Air Hand Gesture"*, ACM Symposium on Spatial User Interaction (**SUI**, 29% acceptance rate), 2014

[C.2] Saikat Gupta, **Sujin Jang**, Karthik Ramani, *"PuppetX: A Framework for Gestural Interactions with User Constructed Playthings"*, ACM Conference on Advanced Visual Interfaces (**AVI**, 28% acceptance rate), 2014

[C.1] **Sujin Jang**, Ashwin Dani, Carl Crane, Warren Dixon, *"Experimental Results for Moving Object Structure Estimation using an Unknown Input Observer Approach"*, ASME Conference on Dynamic Systems and Control (**DSCC, Best Paper in Session**), 2012

Patents

Granted

[G.3] US Patent 12,169,917, *"Method and device with data processing using neural network"*, Dec 17, 2024
[G.2] US Patent 11,320,984, *"Pressure sensing device interface representation"*, May 3, 2022
[G.1] US Patent 11,023,769, *"Modifying an image based on identifying a feature"*, Jun 1, 2021

Published & Pending

[P.10] US Patent App. 19/012,313, *"Method and Device with Autonomous Driving"*, 2026
[P.9] US Patent App. 18/972,088, *"Method and Apparatus with 3D Occupancy Prediction Learning"*, 2025
[P.8] US Patent App. 19/040,535, *"Method and Apparatus with Three-Dimensional Object Detection"*, 2025
[P.7] US Patent App. 18/936,286, *"Method and Apparatus with Vehicle Driving Control"*, 2025
[P.6] US Patent App. 18/897,759, *"Method and Apparatus with Object Detection Model Training"*, 2025
[P.5] US Patent App. 18/605,119, *"Method and Apparatus with Vector Map Learning and Generation"*, 2025
[P.4] US Patent App. 18/605,119, *"Method and Device with Data Processing Using Neural Network"*, 2025
[P.3] US Patent App. 18/340,996, *"Method and apparatus with object estimation model training"*, 2024
[P.2] US Patent App. 18/451,287, *"Method and apparatus with object detector training"*, 2024
[P.1] US Patent App. 18/109,928, *"Method and apparatus with data labeling"*, Nov 9, 2023

Teaching Experience

Purdue University

West Lafayette, IN, USA

Toy Design (ME444), Graduate Teaching Assistant *Aug. 2013 - May. 2016*

- Course goals: generate and communicate design ideas; effective use of CAD tools and rapid prototyping for action toy design; learn fundamentals of finite element analysis
- Instructed undergraduate students during the lab sessions and guided them to complete action toy design projects.
- Received *"Magoon Excellence in Teaching Award (2015)"*

Advising & Mentoring

On-site Research Intern @ Samsung Advanced Institute of Technology

Suwon, South Korea

Heeju Ko (Ph.D. Student @ Korea University) *Jun. 2024 - Feb. 2025*

- Efficient 3D occupancy prediction [C.11]
- Online vision-language navigation with reinforcement learning [C.12]

Gyeongrok Oh (Ph.D. Student @ Korea University) *Oct. 2023 - Feb. 2025*
- Efficient 3D occupancy prediction [C.11]
- Online vision-language navigation with reinforcement learning [C.12]

Seungyeon Yoo (Ph.D. Student @ Seoul National University) *Jul. 2023 - Sep. 2023*
- Generative self-supervised learning for 3D scene understanding

Wonjeong Ryoo (Ph.D. Student @ KAIST) *Jul. 2023 - Nov. 2023*
- Cross-modal domain transfer learning for 3D object detection [U.J.3]

Jongwoo Park (Ph.D. Student @ Stony Brook University) *Jun. 2023 - Aug. 2023*
- Unsupervised 3D representation learning for occupancy prediction

Sungjune Kim (Ph.D. Student @ Korea University) *Mar. 2023 - Feb. 2025*
- Efficient 3D occupancy prediction [C.11]
- Online vision-language navigation with reinforcement learning [C.12]

Gyusam Chang (Ph.D. Student @ Korea University) *Oct. 2022 - Jun. 2024*
- Cross-Modal domain transfer learning for 3D object detection [C.8][U.J.3]
- Unified domain generalization and adaptation [C.9]

Wonseok Roh (Ph.D. Student @ Korea University) *Sep. 2022 - Mar. 2023*
- Cross-modal domain transfer learning for 3D object detection [C.8]

Honors and Awards

- *Samsung Best Paper Award (Bronze, AI&SW Division)*, Samsung Group, 2023
- *NeurIPS Oral Presentation (Top 6.9% of Submissions)*, Neural Information Processing Systems, 2022
- *Boundless Search for Breakthroughs Award for Autonomous Driving*, SAIT, Samsung Electronics, 2022
- *Device+ Team Excellence Awards for AR Vertical Healthcare*, Lenovo, 2018
- *Magoon Excellence in Teaching Award, College of Engineering*, Purdue University, West Lafayette, IN, 2015
- *Best Paper in Session Award*, ASME Dynamic Systems and Control Conference, Fort Lauderdale, FL, 2012

Media Coverage

- *"Samsung's Exynos Auto V920 To Power Hyundai Motor's Next-Generation IVI Systems"*, Samsung Newsroom, June 7th, 2023
- *"Samsung Electronics tested Level 4 autonomous driving"*, Sisa Journal-e, May 24th, 2023
- *"Arm and muscle fatigue accumulates during prolonged use of mid-air computer interfaces"*, DATAQUEST, June 13th, 2017
- *"Researchers Study Gorilla Arm Fatigue in VR Gaming"*, VR Times, May 9th, 2017
- *"Study researches 'gorilla arm' fatigue in mid-air computer usage"*, Physics.org, May 9th, 2017

Invited Talks

- *"Human-centered Physical Intelligence"* @ Kakao Mobility, Seongnam-si, South Korea, Apr., 2026
- *"Distortion-aware Domain Adaptation for Unsupervised Semantic Segmentation"* @ Industrial Math Workshop, Suwon, South Korea, Dec., 2022
- *"Interactive Machine Learning for Analyzing Natural Gesture Patterns in Mid-Air Interaction"* @ Motorola Mobility LLC., Chicago, IL, Jan., 2017

Academic Service

Reviewer
- [AAAI] AAAI Conference on Artificial Intelligence
- [NeurIPS] Conference on Neural Information Processing Systems
- [ICLR] International Conference on Learning Representations
- [CVPR] IEEE Conference on Computer Vision and Pattern Recognition
- [ECCV] European Conference on Computer Vision
- [ICCV] CVF/IEEE International Conference on Computer Vision
- [WACV] IEEE/CVF Winter Conference on Applications of Computer Vision
- [BMVC] British Machine Vision Conference
- [CHI] ACM Conference on Human Factors in Computing Systems
- [CSCW] ACM Conference on Computer Supported Collaborative Work