# Sujin Jang

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## Resaerch Interests

My current and past research work broadly involve machine learning, human-computer interaction, computer vision, and robotics. More recently, I am primarily interested in multi-modal 3D scene understanding, cross-modal representation learning, and domain adaptation/generalization for computer vision and robotics tasks. Fundamentally, I am deeply interested in exploring the human-like adaptability of AI models capable of solving complex, real-world problems.

## Professional Experience

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

Principal Researcher *Mar 2024 - Present*

- Technical lead of multi-view 3D vision systems for autonomous driving;
- Cross-modal representation learning algorithms;
- Unsupervised domain adaptation & generalization for 3D scene understanding;
- Compositional generalization & causality

Staff Researcher *Jun 2020 - Feb 2024*

- Technical lead of multi-view 3D vision systems for autonomous driving;
- Cross-modal representation learning algorithms;
- Unsupervised domain adaptation & generalization for 3D scene understanding

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

Staff Engineer *Jan 2019 - Jun 2020*

- Frontal-facing camera systems for ADAS;
- Object detection and semantic segmentation algorithms for autonomous driving;
- Hardware-aware quantization;
- GPU/NPU compiler for optimal neural network inference

**Motorola Mobility LLC.** *Chicago, IL, USA*

Machine Learning Staff Researcher *Jun 2017 - Dec 2018*

- Object detection, semantic segmentation, and hand pose estimation for AR/VR applications;
- Optimization and acceleration of neural network models for smart mobile devices;
- Human activity analyses based on various types of wearable sensors;
- Machine learning algorithms for smart mobile/healthcare devices

## Education

**Purdue University** *West Lafayette, IN, USA*

Ph.D., in Mechanical Engineering *May 2017*

- Specialization: Human-Computer Interaction, Visual Analytics, Machine Learning
- 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., in Mechanical Engineering *Aug 2012*

- Specialization: Vision-based Nonlinear Estimation/Control, Robotics, Machine Learning
- 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., in Mechanical and Automotive Engineering *Aug 2010*

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

## Publications

**Conference Proceedings** (*: equal contributions, ✉: corresponding authors)

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

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 ∼ 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

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 Award**), 2012

### Journal Articles

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 (*: equal contributions)

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 / **IEEE VAST** 2015 (22% acceptance rate).

### Patens

P.6 **Sujin Jang**, Dae Ung JO, *"Method and apparatus with object estimation model training"*, US Patent App. 18/340,996, 2024

P.5 **Sujin Jang**, Sangpil Kim, Jinkyu Kim, Wonseok Roh, Gyusam Chang, Dongwook Lee, Dae Hyun JI, *"Method and apparatus with object detector training"*, US Patent App. 18/451,287, 2024

P.4 Jaewoo Lee, Yonggonjong Park, KapJe Sung, **Sujin Jang**, *"Method and apparatus with data labeling"*, US Patent App. 18/109,928, 2023

P.3 **Sujin Jang**, Joohan Na, Dokwan Oh, *"Method and device with data processing using neural network"*, US Patent App. 17/575,002, 2022

P.2 Nikhil Madhusudhana, Vivek Tyagi, Navin Dabhi, Hong Zhao, **Sujin Jang**, *"Pressure sensing device interface representation"*, US Patent 11,320,984, 2022

P.1 Ming Qian, **Sujin Jang**, John Weldon Nicholson, Song Wang, *"Modifying an image based on identifying a feature"*, US Patent 11,023,769, 2021

## Honors and Awards

A.4 **Samsung Best Paper Award (Bronze, AI&SW Division)**, Samsung Group, 2023

A.3 **Boundless Search for Breakthroughs Award for Autonomous Driving**, SAIT, Samsung Electronics, 2022

A.2 **Magoon Excellence in Teaching Award**, College of Engineering, Purdue University, West Lafayette, IN, 2015

A.1 **Best Paper in Session Award**, ASME Dynamic Systems and Control Conference, Fort Lauderdale, FL, 2013

## Teaching Experience

**School of Mechanical Engineering, Purdue University** *West Lafayette, IN, USA*

Graduate Teaching Assistant *Aug. 2013–May. 2016*

**ME 444: Computer-aided design and rapid prototyping**

- Course goals: generating and communicating design ideas, effective use of CAD tools for product design, action toy design
- Instructed undergraduate students during the lab sessions and guided them to complete toy design projects

## Media Coverage

M.5 **Health Hazards: Beware of 'gorilla arm syndrome**, DECCAN CHRONICLE, June 23rd, 2017 (Article link)

M.4 **Arm and muscle fatigue accumulates during prolonged use of mid-air computer interfaces say Purdue University researchers**,

DATAQUEST, June 13th, 2017 (Article link)

M.3 **Researchers Study Gorilla Arm Fatigue in VR Gaming**, VR Times, May 9th, 2017 (Article link)

M.2 **Study researches 'gorilla arm' fatigue in mid-air computer usage**, Physics.org, May 9th, 2017 (Article link)

M.1 **Do YOU suffer from 'gorilla arm'? Experts warn virtual reality controllers are leading to new medical problems**, DailyMail, May 9th, 2017 (Article link)

## Scientific Community Service

- [CVPR] Reviewer, IEEE Conference on Computer Vision and Pattern Recognition, 2023 ∼
- [ECCV] Reviewer, European Conference on Computer Vision, 2024
- [AAAI] Reviewer, AAAI Conference on Artificial Intelligence, 2025
- [CHI] Reviewer, ACM Conference on Human Factors in Computing Systems, 2016 ∼
- [CSCW] Reviewer, ACM Conference on Computer Supported Collaborative Work, 2016 ∼
- [ISMAR] Reviewer, IEEE International Symposium on Mixed and Augmented Reality, 2021
- [VR] Reviewer, IEEE Conference on Virtual Reality, 2018–2019
- [3DUI] Reviewer, IEEE Symposium on 3D User Interfaces, 2016
- [TVCG] Reviewer, IEEE Transaction on Visualization and Computer Graphics, 2017
- [InfoVis] Reviewer, IEEE Conference on Information Visualization, 2015
- [VAST] Reviewer, IEEE Conference on Visual Analytics Science and Technology, 2016–2020
- [EuroVis] Reviewer, EG/VGTC Conference on Data Visualization, 2016
- Student Volunteer, IEEE VIS, 2015
- [UIST] Reviewer, ACM Symposium on User Interface Software and Technology, 2018
- [MobileCHI] Reviewer, ACM International Conference on Mobile Human-Computer Interaction, 2019
- [SUI] Reviewer, ACM Symposium on Spatial User Interaction, 2019
- [DIS] Reviewer, ACM Conference on Designing Interactive Systems, 2016–2017
- [TEI] Reviewer, ACM Conference on Tangible, Embedded, and Embodied Interaction, 2017
- [IDC] Reviewer, ACM Conference on Interaction Design and Children, 2017
- [JCISE] Reviewer, ASME Journal of Computing and Information Science in Engineering, 2023

## References

Available upon request