

# Sujin Jang

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## Research Interests

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My current and past research work broadly involve machine learning, human-computer interaction, visual analytics, and robotics. More recently, I am primarily interested in self-supervised learning, domain generalization, and cross-modal representation learning for computer vision tasks in the field of autonomous driving.

## Professional Experience

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### Samsung Advanced Institute of Technology (SAIT)

Suwon, South Korea

Staff Researcher

Jun 2020 - Present

- Technical lead of multi-view 3D vision systems for autonomous driving;
- Cross-modal representation learning algorithms;
- Unsupervised domain adaptation methods for visual perception

### 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

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### 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: Junggha Kim

## Publications

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### Journal Articles

- J.2 **S. Jang\***, A. Villanueva\*, W. Stürzlinger, S. Ambike, K. 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 **S. Jang**, N. Elmqvist, K. 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).

### Conference Proceedings (peer-reviewed)

- C.8 G. Chang\*, W. Roh\*, **S. Jang**, D. Lee, D. Ji, G. Oh, J. Park, J. Kim, S. Kim, "CMDA: Cross-Modal and Domain Adversarial Adaptation for LiDAR-based 3D Object Detection", Proceedings of the AAAI Conference on Artificial Intelligence (AAAI, 23.7% acceptance rate), 2024 (\*: equal contributions)

- C.7 **S. Jang\***, D. Jo\*, S. Hwang, D. Lee, D. Ji, “STXD: Structural and Temporal Cross-Modal Distillation for Multi-View 3D Object Detection”, Proceedings of the Conference on Neural Information Processing Systems (NeurIPS, 26.1% acceptance rate), 2023 (\*: equal contributions)
- C.6 **S. Jang**, J. Na, D. Oh, “DaDA: Distortion-aware Domain Adaptation for Unsupervised Semantic Segmentation”, Proceedings of the Conference on Neural Information Processing Systems (NeurIPS–Oral, 184/2665 ~ 6.9%), 2022
- C.5 **S. Jang**, W. Stuerzlinger, S. Ambike, K. Ramani, “Modeling Cumulative Arm Fatigue in Mid-Air Interaction based on Perceived Exertion and Kinetics of Arm Motion”, In Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI, 25% acceptance rate), 2017
- C.4 C. Choi, A. Sinha, J. H. Choi, **S. Jang**, K. Ramani, “A Collaborative Filtering Approach to Real-Time Hand Pose Estimation”, Proceedings of the IEEE Interactional Conference on Computer Vision (ICCV, 30% acceptance rate), 2015
- C.3 **S. Jang**, N. Elmqvist, K. Ramani, “GestureAnalyzer: Visual Analytics for Pattern Analysis of Mid-Air Hand Gesture”, Proceedings of the ACM Symposium on Spatial User Interaction (SUI, 29% acceptance rate), 2014
- C.2 S. Gupta, **S. Jang**, K. Ramani, “PuppetX: A Framework for Gestural Interactions With User Constructed Playthings”, Proceedings of the ACM Conference on Advanced Visual Interfaces (AVI, 28% acceptance rate), 2014
- C.1 **S. Jang**, A. P. Dani, C. D. Crane, W. E. Dixon, “Experimental Results for Moving Object Structure Estimation using an Unknown Input Observer Approach”, Proceedings of the ASME Conference on Dynamic Systems and Control (DSCC, Best Paper in Session Award), 2012

## Patens

- P.4 J Lee, Y Park, KJ Sung, **S. Jang** “Method and apparatus with data labeling”, US Patent App. 18/109,928, 2023
- P.3 **S. Jang**, J Na, D Oh “Method and device with data processing using neural network”, US Patent App. 17/575,002, 2022
- P.2 N. A. Madhusudhana, V. K. Tyagi, N. Dabhi, H. Zhao, **S. Jang**, “Pressure sensing device interface representation”, US Patent 11,320,984, 2022
- P.1 M. Qian, **S. Jang**, J. W. Nicholson, S. Wang, “Modifying an image based on identifying a feature”, US Patent 11,023,769, 2021

## Honors and Awards

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- A.3 **Samsung Best Paper Award (Bronze, AI&SW Division)**, Samsung Group, 2023
- 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

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### 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

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- 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

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- [CVPR] Reviewer, IEEE Conference on Computer Vision and Pattern Recognition, 2023,2024
- [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
- [CSCW] Reviewer, ACM Conference on Computer Supported Collaborative Work, 2016–2024
- [CHI] Reviewer, ACM Conference on Human Factors in Computing Systems, 2016–2024

- [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

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Available upon request