



# Sangil Lee

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## EXPERIENCE

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### Staff Engineer

- System LSI, Samsung Electronics Sep. 2022 – present

### Conference Assistant

- International Conference on Control, Automation and Systems 12 Oct. 2021 – 15 Oct. 2021
- Asian Control Conference 4 May 2022 – 5 May 2022

### Teaching Assistant

- UAV Decision making, Seoul National University 2015

### Sigma Intelligence, Seoul National University

*member of robotics club*

- Served as club vice president Mar. 2012 – Feb. 2013
- Served as education director Mar. 2011 – Feb. 2012

## EDUCATION

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### Seoul National University, Korea, Republic of

Sep. 2017 – Aug. 2022

*Ph.D. in Mechanical and Aerospace Engineering*

- Dissertation: Robust Event-based Angular Velocity Estimation in Dynamic Environments
- Advisor: Professor H. Jin Kim
- Cumulative GPA: 3.67/4.3

### Seoul National University, Korea, Republic of

Mar. 2015 – Aug. 2017

*M.S. in Mechanical and Aerospace Engineering*

- Thesis: Robust Visual Odometry via Rigid Motion Segmentation for Dynamic Environments
- Advisor: Professor H. Jin Kim
- Cumulative GPA: 3.89/4.3

### Seoul National University, Korea, Republic of

Mar. 2010 – Feb. 2015

*B.S. in Electrical and Computer Engineering*

- Thesis: Adaptive Formation Control for Multi-agent Systems
- Advisor: Professor Hyungbo Shim
- GPA: 3.82/4.3 (cumulative) 3.95/4.3 (in major) Cum Laude

## PROJECTS

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### Research on Visual Navigation for Autonomous Vehicle

May. 2016 – Apr. 2020

- Objective: Autonomous visual navigation for unmanned vehicle in dynamic environments
- Organization: SNU-Samsung Smart Campus R&D

## RFD Solution Advancement Development

Jun. 2019 – Nov. 2019

- Objective: Recognize target objects and measure the distance using monocular camera and imu
- Organization: Hyundai MnSoft

## Adaptive Multimodal Integration for Accuracy Assurance of Navigation Systems

Oct. 2016 – Mar. 2017

- Objective: Integration of sensors in an adaptive manner, depending on the context of mission and ambiguity of signal properties
- Organization: Lockheed Martin RoKST&R Initiatives

## Development of Construction Sites Mapping with Drones and Images

Jun. 2015 – Jan. 2016

- Objective: Automatic construction site monitoring system using panoramic map generated by drone
- Organization: Hyundai Heavy Industries

# PUBLICATIONS

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## INTERNATIONAL JOURNALS

Haram Kim, **Sangil Lee**, Junha Kim, and H. Jin Kim, “Real-time Hetero-Stereo Matching for Event and Frame Camera with Aligned Events Using Maximum Shift Distance,” *IEEE Robotics and Automation Letters (RA-L)*, 2022.

**Sangil Lee** and H. Jin Kim, “Low-latency and Scene-robust Asynchronous Optical Flow Stream and Angular Velocity Estimation,” *IEEE Access*, 2021.

**Sangil Lee**, Chungkeun Lee, Haram Kim, and H. Jin Kim, “Real-time Object-aware Monocular Depth Estimation in Onboard Systems,” *International Journal of Control, Automation, and Systems (IJCAS)*, 2020.

## INTERNATIONAL CONFERENCES

Howoong Jun, **Sangil Lee**, and Songhwa Oh, “EventPointNet: Robust Keypoint Detection with Neuromorphic Camera Data,” *International Conference on Control, Automation and Systems (ICCAS)*, 2022.

**Sangil Lee**, Haram Kim, and H. Jin Kim, “Motion Estimation from Asynchronous Optical Flows via Particle Filter,” *13th Asian Control Conference*, May 4-7, 2022.

Haram Kim, **Sangil Lee**, and H. Jin Kim, “Semi-dense Disparity Estimation with an Event and a Frame Camera,” *13th Asian Control Conference*, May 4-7, 2022.

**Sangil Lee**, Clark Youngdong Son, and H. Jin Kim, “Robust Real-time RGB-D Visual Odometry in Dynamic Environments via Rigid Motion Model,” *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2019.

**Sangil Lee**, Haram Kim, and H. Jin Kim, “Edge Detection for Event Cameras using Intra-pixel-area Events,” *The British Machine Vision Conference (BMVC)*, 2019.

Changhyeon Kim, Pyojin Kim, **Sangil Lee**, and H. Jin Kim, “Edge-based Robust RGB-D Visual Odometry Using 2-D Edge Divergence Minimization,” *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2018.

**Sangil Lee** and H. Jin Kim, “Real-time Rigid Motion Segmentation using Grid-based Optical Flow,” *IEEE International Conference on System, Man, and Cybernetics (SMC)*, 2017.

Changhyeon Kim, **Sangil Lee**, and H. Jin Kim, “Convergence-Enhanced Dense RGB-D Odometry with a Rotational Motion Prior from a Gyroscope,” *The 2017 Asian Control Conference (ASCC)*, 2017.

Changhyeon Kim, **Sangil Lee**, Pyojin Kim, and H. Jin Kim, “Time-Efficient Dense Visual 12-DoF State Estimator Using RGB-D Camera,” *International Conference on Ubiquitous Robots and Ambient Intelligence (URAI)*, 2017.

**Sangil Lee**, P. Jin Kim, Changhyeon Kim, and H. jin Kim, “Depth-based Direct Visual Odometry for Stereo Camera,” *Asia-Pacific International Symposium on Aerospace Technology (APISAT)*, 2016.

**Sangil Lee**, Seung-jae Lee, Jaehyun Park, and H. Jin Kim, “Exposure Correction and Image Blending for Planar Panorama Stitching,” *International Conference on Control, Automation and Systems (ICCAS)*, 2016. **(Outstanding Paper Award)**

**Sangil Lee** and H. Jin Kim, “Detection of 3-Dimensional Textured Object without Depth Information,” *14th International Conference on Control, Automation and Systems (ICCAS)*, Korea, October 13-16, 2015.

## DOMESTIC JOURNALS

**Sangil Lee**, P. Jin Kim, Changhyeon Kim, Hyeonbeom Lee, and H. Jin Kim, “Survey on Visual Odometry Technology for Unmanned Systems,” *Journal of Institute of Control, Robotics, and Systems*, 23(6):424-431, 2017.

## DOMESTIC CONFERENCES

**Sangil Lee**, Haram Kim, Changhyeon Kim, and H. Jin Kim, “Optical Flow Estimation for Event Cameras using Surface of Time Difference Correspondence,” *35th Institute of Control, Robotics and Systems*, July 2-4, 2020.

Changhyeon Kim, **Sangil Lee**, and H. Jin Kim, “Hybrid RGB-D Visual Odometry Combining Edges and Point Features,” *35th Institute of Control, Robotics and Systems*, July 2-4, 2020.

Haram Kim, **Sangil Lee**, and H. Jin Kim, “Cost function for calculating similarity of normalized image patch in heterogeneous cameras,” *35th Institute of Control, Robotics and Systems*, July 2-4, 2020.

**Sangil Lee** and H. Jin Kim, “Image Stitching for 2-D Global Mapping,” *31st Institute of Control, Robotics and Systems Annual Conference*, March 10-11, 2016.

**Sangil Lee** and H. Jin Kim, “Hexa-rotors 3-dimensional Position Control based on Spiral Potential Function with Collision Avoidance,” *The Korean Society for Aeronautical & Space Sciences Fall Conference*, November 18-20, 2015.

## PATENTS

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Wonhee Lee, **Sangil Lee**, H. Jin Kim, Sunghoon Hong, “Ego Motion Estimation Method and Apparatus,” US 16/238,068.

## HONORS, AWARDS, SCHOLARSHIPS

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|---|-----------------------|
| · Samsung DS PhD Industrial Scholarship                                     | Mar. 2020 – present   |
| · Encouragement Prize (4th place) at the 24th Samsung Humantech Paper Award | 7 Feb. 2018           |
| · Outstanding Paper Award of the Ministry of Trade, Industry, and Energy    | 18 Oct. 2016          |
| · BK21 plus PhD Fellowship Scholarship                                      | Mar. 2015 – Feb. 2016 |
| · First prize in an 2012 International Capstone Design Fair                 | Jan. 2012             |
| · Presidential Science Scholarship  | Mar. 2010 – Feb. 2014 |

## SKILLS

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(Sorted by skillfulness)

<b>Programming</b>	C/C++, Matlab, Javascript, HTML/CSS, Python, Java
<b>Tools/libraries</b>	Vim, Git, OpenCV, ROS, WebGL, Three.js, jQuery
<b>Languages</b>	Korean (native), English
<b>Hardware</b>	Raspberry Pi, Arduino, Basic Spartan FPGA Board
<b>Software</b>	Adobe Photoshop/Premiere, Basic OrCAD, Solidworks, Android Studio