

# Sangil Lee



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## EDUCATION

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**Seoul National University, Korea, Republic of**

Sep. 2017 – present

*Ph.D. (ABD) Student in Mechanical and Aerospace Engineering*

- Research Focus: 3D Vision in Dynamic Environments for Autonomous Systems, Event Cameras
- 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

## EXPERIENCES

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**Teaching Assistant, UAV Decision-making, Seoul National University**

2015

**Sigma Intelligence, Seoul National University**

*member of robotics club*

- Served as club vice president
- Served as education director

Mar. 2012 – Feb. 2013

Mar. 2011 – Feb. 2012

## PUBLICATIONS

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### INTERNATIONAL JOURNALS

**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 Songhwai Oh, “EventPointNet: Robust Keypoint Detection with Neuromorphic Camera Data,” *IEEE International Conference on Robotics and Automation (ICRA)*, 2021. (submit)

**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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<b>Programming</b>	C/C++, Matlab, Simulink, ROS, LabVIEW, Markdown, Android Studio
<b>Languages</b>	English, Korean (native)
<b>Hardware</b>	AVR, Arduino, Arm Processor, Basic Spartan FPGA Board
<b>Tools</b>	Vim, Git, Adobe Photoshop/Premiere, Basic OrCAD, Solidworks