Sanghoon **Lee**

Electronics Engineer · Hardware

Globalplaza B/D No.1318, Kyungpook National University(KNU), 80, Daehak-ro, Buk-gu, Daegu, Republic of Korea, 41566

(+82) 10-9494-5115 | tonightparty@knu.ac.kr, tonightparty82@gmail.com | https://tonightparty.github.io

Education

Kyungpook National University — *Daegu, S.Korea*

Ph.D. in Electronics Engineering — *Mar. 2011 – Aug. 2021*

- Thesis : Efficient Power Control Using Variable Resolution Algorithm for LiDAR Sensor-based Autonomous Vehicle

Kyungpook National University — *Daegu, S.Korea*

M.S. in Electronics Engineering — *Mar. 2009 – Feb. 2011*

- Thesis : Design of the Hybrid 4-bits A/D Converter

Dong-A University — *Busan, S.Korea*

B.S. in Electronics Engineering — *Mar. 2005 – Feb. 2009*

Job Carrier

Kyungpook National University(KNU) — *Daegu, S.Korea*

Professor for Industry Collaboration Purpose — *Mar. 2022 – Present*

- Industrty-University Collaboration Purpose
- Hardware design / verification of circuit & system
- Coding & design for FPGA

CARNAVICOM Co., Ltd. — *Incheon, S.Korea*

Hardware Engineer (Senior Researcher) — *Jun. 2018 – Feb. 2022*

- System architecture design of LiDAR sensor
- Hardware design / verification of LiDAR sensor
- Software design for efficient power control of LiDAR sensor
- System architecture design of domain control unit(DCU)
- Hardware design and verification of domain control unit(DCU)

Gyeongbuk Institute of IT Convergence Industry Technology — *Gyeongsan, Gyeongsangbuk, S.Korea*

Hardware Engineer (Researcher) — *Nov. 2015 – May. 2018*

- Hardware design of circuit & PCB
- Application test of LiDAR sensor

Skills

Design	PCB & Artwork, ASIC Simulation & Design
Programming	C/C++, LaTeX, Verilog
Languages	Korean, English

Extracurricular Activity

ASIC (Application Specific Integrated Circuit) Lab. — *S.Korea*

Member — *Mar. 2009 - PRESENT*

- Analog Circuit & A/D Converter design
- Write several paper about A/D Converter

AI-SoC (AI-Embedded System-Software-on-Chip Platform) Lab. — *S.Korea*

Member — *Jun. 2019 - PRESENT*

- LiDAR sensor in Hardware design & Algorithm
- Write several paper about LiDAR sensor

Publications

International Journal Paper

Accuracy-Power Controllable LiDAR Sensor System with 3D Object Recognition for Autonomous Vehicle — *Sensors*

S. H. Lee, D. K. Lee, P. Choi, and D. J. Park — *2020*

- SCI(E), Q1

Domestic Journal Paper (KCI)

Dynamic Object Detection Architecture for LiDAR Embedded Processors — *Journal of Platform Technology (JPT)*

M. W. Jung, S. H. Lee, and D. Y. Kim — *2021*

Efficient Power Reduction Technique of LiDAR Sensor for Controlling Detection Accuracy Based on Vehicle Speed — *IEMEK Journal of Embedded Systems and Applications*

S. H. Lee, M. W. Jung, D. K. Lee, P. Choi, and D. J. Park — *2020*

Preliminary study of Angle sensor module for Vehicle Steering System Based on Multi-track Encoder — *Journal of Sensor Science and Technology (JSST)*

S. T. Woo, C. S. Han, J. B. Baek, S. H. Lee, M. W. Jung, S. J. Choo, J. R. Park, J. H. Yoo, S. H. Jung, and J. Y. Kim — *2017*

Algorithm of Modified Single-slope A/D Converter with Improved Conversion Time for CMOS Image Sensor System — *Journal of Sensor Science and Technology (JSST)*

S. H. Lee, J. T. Kim, J. K. Shin, and P. Choi — *2015*

Design of 8-bit Single Slope ADC for Signal Processing of Multiple Image Sensors — *Journal of Sensor Science and Technology (JSST)*

J. C. Lee, S. H Lee, J. T. Kim, J. R. Park, J. K. Shin, and P. Choi — *2015*

Presentation

International Conference

ISOCC2021 (18th International SoC Design Conference) — *Jeju Island, S.Korea*

Poster Presentation — *Oct. 2021*

- Efficient Power Control Using Variable Resolution Algorithm for LiDAR Sensor-based Autonomous Vehicle

TENSYMP2021 (2021 IEEE Region 10 Symposium) — *Jeju Island, S.Korea*

Oral Presentation — *Aug. 2021*

- Accelerated Signal Processing of Burst-Mode Streamline Data for Low-Power Embedded Multi-Channel LiDAR Systems

GCCE2020 (2020 IEEE 9th Gloval Conference on Consumer Electronics) — *Kobe, Japan*

Oral Presentation — *Oct. 2020*

- Frequency Shift Keying and Error Correction Technique for Robust Electrostatic Coupling Intra-Body Communication

BIC2020 (The International Conference on Big data, IoT, and Cloud Computing) — *Jeju Island, S.Korea*

Oral Presentation — *Aug. 2020*

- Accuracy-Power Controllable LiDAR Sensor for Autonomous Vehicles using an Algorithm of Variable Resolution

AWAD2015 (2015 Asia-Pacific Workshop on Fundamentals and Applications of Advanced Semiconductor Devices) — *Jeju Island, S.Korea*

Oral Presentation — *Jun. 2015*

- Modified Single-slope A/D Converter with Improving Conversion Time for CIS System

ICEIC2015 (The 14th International Conference on Electronics, Information, and Communication) *Singapore*

Poster Presentation *Jan. 2015*

- Clock-Less 8-bit Pipeline-Like Novel A/D Converter

APCOT2014 (The 7th Asia-Pacific Conference on Transducers and Micro/Nano Technologies) *Daegu, S.Korea*

Poster Presentation *Jul. 2014*

- MODIFIED SINGLE-SLOPE A/D CONVERTER WITH IMPROVING CONVERSION TIME FOR CIS SYSTEM

Domestic Conference

2017 IEIE FALL CONFERENCE *Incheon, S.Korea*

Poster Presentation *Nov. 2017*

- Object Perception Algorithm based on LiDAR for Autonomous Vehicle

ISET2017 (2017 IEMEK Symposium on Embedded Technology) *Busan, S.Korea*

Poster Presentation *May. 2017*

- Design of InGaAs quantum well laser diode for LiDAR application

ISET2017 (2017 IEMEK Symposium on Embedded Technology) *Busan, S.Korea*

Poster Presentation *May. 2017*

- Automatic Recognition System for Weld Bead Detection

ISET2016 (2016 IEMEK Symposium on Embedded Technology) *Daejeon, S.Korea*

Poster Presentation *May. 2016*

- Algorithm of Clock-less 8-bit Pipeline-like Novel A/D Converter for Bead Detection Image Sensor
- Best Paper AWARD

ISOCCC2014 (2014 IDEC SoC Congress Chip Design Contest) *Jeju Island, S.Korea*

Poster Presentation *Nov. 2014*

- Design of Clock-Less 8-bit Pipeline A/D Converter

2014 IEEK Summer Conference *Jeju Island, S.Korea*

Oral Presentation *Jun. 2014*

- Development of Ultraviolet Signal Processing Circuit System for Ultraviolet Image

2011 IEEK Fall Conference *Daejeon, S.Korea*

Poster Presentation *Nov. 2011*

- Design of the Hybrid 8-bits A/D Converter

Honors & Awards

Domestic

2015 **Best Paper AWARD**, ISET2016 (2016 IEMEK Symposium on Embedded Technology) *Daejeon, S.Korea*

National Project

Software Disaster Research Center *Ministry of Science and ICT (MSIT) and National Research Foundation of Korea (NRF), S.Korea*

Role: R&D management (KNU) *Mar. 2022 – Present*

High-Resolution 3D Solid-Stat Lidar Development *Ministry of Trade, Industry & Energy (MOTIE), S.Korea*

Role: Signal processing module design (CARNAVICOM) *Apr. 2021 – Feb. 2022*

(Part2) Electric truck bus vehicle application technology and operation environment development using flexible rolling chassis

Ministry of Trade, Industry & Energy (MOTIE), S.Korea

Role: Development of sensors for electric truck (CARNAVICOM)

May. 2020 – Feb. 2022

Development of automatic steering-based accident avoidance system for electric-driven port yard tractors operating at low speed (less than 30 km/h)

Ministry of Trade, Industry & Energy (MOTIE), S.Korea

Role: Development of system (CARNAVICOM)

Apr. 2020 – Feb. 2022

Development of Selfdriving Parts and Vehicle Mounting Technology for Large Bus

Ministry of Trade, Industry & Energy (MOTIE), S.Korea

Role: Circuit design of LiDAR Sensor (CARNAVICOM)

Jun. 2019 – Dec.2021

Development of low price 3D LiDAR for measurement of service robots in indoor and outdoor environment

Ministry of Trade, Industry & Energy (MOTIE), S.Korea

Role: Circuit design of LiDAR Sensor (CARNAVICOM)

Apr. 2019 – Dec.2021

Open Platform Development for Remote Management on Embedded Software

Ministry of Education (MOE) and National Research Foundation of Korea (NRF), S.Korea

Role: Embedded software test (CARNAVICOM)

Jun. 2018 – Aug. 2021

The Development of low-cost LiDAR Sensor including Laser Diode and Semiconductor for Autonomous Car

Ministry of Trade, Industry & Energy (MOTIE), S.Korea

Role: Test/verification (GITC) and Circuit design of LiDAR Sensor (CARNAVICOM)

May. 2017 – Dec. 2020

Development of paper document management system with smart cabinet based on IoT technology

Ministry of Trade, Industry & Energy (MOTIE), S.Korea

Role: Circuit & module design for IoT (GITC)

Mar. 2017 – May. 2018

Development of negative-ion air purification device for vehicles with indoor pollution detection function

Ministry of SMEs and Startups(MSS), S.Korea

Role: Circuit design for sensor (GITC)

Jun. 2016 – May. 2018

System development of automated sensing of hazardous objects for construction safety and precise location tracking of workers

Ministry of Land, Infrastructure and Transport (MOLTI), S.Korea

Role: Circuit design for sensor (GITC)

Apr. 2016 – Dec. 2017

The Development of the 8-channel 15f/s grade scanning LiDAR Sensor for autonomous car

Ministry of Trade, Industry & Energy (MOTIE), S.Korea

Role: Verification of LiDAR sensor (GITC)

Aug. 2015 – Jul. 2017

Development of Intelligence Fusion Visual Sensor Module

Ministry of Education and Science Technology (MEST), S.Korea

Role: Circuit design for image, UV and IR sensor (KNU)

Mar. 2012 – Feb. 2015

MEMS Research Center for National Defense

Agency for Defense Development (ADD), S.Korea

Role: Circuit design for sensor (KNU)

Mar. 2009 – Dec. 2012

Patents

Domestic Patents

Nov. 2021	**10-2021-0163010,** Vision-based real-time vehicle detection and tracking algorithm for forward collision warning	*S.Korea*
Nov. 2021	**10-2021-0163009,** Semantic depth data transmission reduction techniques using frame-to-frame masking method for light-weighted LiDAR signal processing platform	*S.Korea*
Jan. 2021	**10-2210-6010000,** LiDAR system for reducing power consumption and method of driving the same, registered	*S.Korea*
Dec. 2020	**10-2191-1090000,** Autonomous unmanned aerial vehicle and control method in the same, registered	*S.Korea*
Dec. 2019	**10-2019-0175337,** Operation server for searching code block using hot spot extraction and operation platform system including the same	*S.Korea*
Nov. 2017	**10-2017-0152535,** Platform system for employment of IoT device, registered	*S.Korea*
May. 2016	**10-2016-0058685,** Weld bead detecting method based on image	*S.Korea*

International Patents

Nov. 2021	**17/613453,** LiDAR system for reducing power consumption and method of driving the same	*United State America, USA*
Dec. 2020	**PCT/KR2020/018248,** LiDAR system for reducing power consumption and method of driving the same	*S.Korea, KIPO*
Dec. 2020	**PCT/KR2020/018249,** Autonomous unmanned aerial vehicle and control method in the same	*S.Korea, KIPO*