Sungjin Cheong

CS PhD Student @ University of Wisconsin-Madison

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Education

- **University of Wisconsin-Madison** — *Sep. 2025 – Present*
  Ph.D. in Computer Sciences (*Advisor: Mohit Gupta*) — Madison, WI, USA
- **Korea Advanced Institute of Science and Technology (KAIST)** — *Sep. 2021 – Aug. 2023*
  M.S. in Mechanical Engineering (*Advisor: Yong-Hwa Park*) — Daejeon, Republic of Korea
- **Yonsei University** — *Mar. 2014 – Aug. 2021*
  B.S. in Mechanical Engineering — Seoul, Republic of Korea
  - **Cumulative GPA**: 3.73 / 4.3; **Major GPA**: 3.81 / 4.3; **Last 2 Years' GPA**: 3.98 / 4.3
  - **Academic Excellence Scholarship**: 4th, 7th semester; **Academic Excellence Award**: 4th semester
  - Military Service (Republic of Korea Army, 2015 – 2017)

Research Interests

- RGB + low-cost ToF sensor fusion for robot vision (multi-modal depth/semantic estimation, mapping, tracking)
- VLM for open-vocabulary robot tasks (grounding language queries to 2D/3D, zero-shot semantic reasoning)
- ToF/LiDAR computational imaging (denoising, signal processing, robust depth under low-SNR, stray light/blooming/MPI)
- Physics- and learning-based modeling for ToF measurements (histogram/correlation-domain formulations, simulation-driven evaluation)

Publications & Conferences

J=Journal, IC=International Conference, DC = Domestic Conference

[IC.1] Gump, A., Henley, C. A., **Cheong, S. J.**, Prabhakara, A., and Gupta, M. **Ghosts in the Point Clouds: De-glaring LiDAR in the Transient Domain**. In **Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)**.

[J.1] **Cheong, S. J.**, Jung, W., Lim, Y. S., and Park, Y. H. **Thermal-Infrared Remote-Target Detection System for Maritime Rescue Using 3-D Game-Based Data Augmentation With GAN**. In **IEEE Transactions on Geoscience and Remote Sensing (TGRS)**. **(SCI, IF: 8.6)**

[IC.2] **Cheong, S. J.**, Ha, J. S. **LiDAR Blooming Artifacts Estimation Method Induced by Retro-Reflectance With Synthetic Data Modeling and Deep Learning**. In **IEEE International Conference on Consumer Electronics-Asia (ICCE-Asia).** (Oral, Accepted)

[IC.3] **Cheong, S. J.**, Lim, Y. S., Jung, W. H., and Park, Y. H. **Infrared Image-Based Remote Target Detection for Maritime Rescue Utilizing a Deep Learning Network and Data Augmentation**. In **Proceedings of SPIE**. (Oral)

[IC.4] Lee, S. H., Lim, Y. S., **Cheong, S. J.**, and Park, Y. H. **MEMS-Based Indirect Time-of-Flight Scanning LiDAR With Parallel-Phase Demodulation and Multi-path Interference Suppression**. In **Proceedings of SPIE**.

[IC.5] Lim, Y. S., Lee, S. H., **Cheong, S. J.**, and Park, Y. H. **A Long-Distance 3D Face Recognition Architecture Utilizing MEMS-Based Region-Scanning LiDAR**. In **Proceedings of SPIE**.

[DC.1] **Cheong, S. J.**, Lee, S. H., Lim, Y. S., and Park, Y. H. **Head Pose Estimation Method Using Depth Camera Based on 3D Point Cloud**. In **Conference of The Korean Society of Mechanical Engineers**. (Oral)

[DC.2] Lee, S. H., Lim, Y. S., **Cheong, S. J.**, and Park, Y. H. **Validation of Simulation Model for 3D Indirect Time-of-Flight Sensor**. In **Conference of The Korean Society of Mechanical Engineers**.

[DC.3] **Cheong, S. J.**, Jung, W., and Park, Y. H. **Infrared Small Object Detection Based on Histogram Transformation**. In **Conference of The Korean Society of Mechanical Engineers**.

[DC.4] Lim, Y. S., Lee, S. H., **Cheong, S. J.**, and Park, Y. H. **Depth Image Super Resolution Method for Time-of-Flight Camera Using Single RGB Image Depth Estimation**. In **Conference of The Korean Society of Mechanical Engineers**.

[DC.5] Lee, S. H., Lim, Y. S., **Cheong, S. J.**, and Park, Y. H. **Depth Error Correction of 3D Scanning Sensor Using Machine Learning**. In **Conference of The Korean Society of Mechanical Engineers**.

Research & Work Experience

- **University of Wisconsin-Madison** *Sep. 2025 – Current*
  Graduate Teaching Assistant Madison, WI, USA
  - TA: CS766 – Computer Vision
  - TA: CS566 – Introduction to Computer Vision

- **LG Innotek Inc.** *Aug. 2023 – Present*
  LiDAR Software Engineer | Base Technology Lab Seoul, Republic of Korea
  Topic: Single-Photon LiDAR Imaging & Statistical Signal Processing
  - Develop **statistical image/signal processing algorithms** for single-photon LiDAR that model Poisson photon arrivals via **binomial likelihood and MLE-based optimization** to recover true transient depth and photon flux from time-correlated histograms.
  - Design **artifact-suppression pipelines** for single-photon LiDAR to remove **ghost images and blooming effects** using time-correlated histogram-domain processing.
  - Implement **range-walk compensation** algorithms for single-photon LiDAR using **statistical image/signal processing** on time-resolved photon histograms.

- **Korea Advanced Institute of Science and Technology (KAIST)** *Sep. 2021 – Aug. 2023*
  Graduate Research Assistant | Human-Machine Interaction Lab Daejeon, Republic of Korea
  Project: Indirect Time-of-Flight LiDAR Imaging & Signal Processing *(Intek Plus Inc., Daejeon, Republic of Korea)*
  - Contributed to the development of an **iToF AMCW LiDAR platform**, including optical architecture, modulation scheme, and signal processing workflow.
  - Developed **machine learning-based signal processing algorithms** to correct **internal stray light and multi-path interference** within the iToF optical system.
  - Built an **iToF LiDAR-based vision platform** that integrates depth and intensity data for downstream 3D perception and human–machine interaction tasks.

  Project: Infrared Imaging *(Korean Coast Guard, Incheon, Republic of Korea)*
  - Led development of an **infrared imaging system** for remote target detection using **physics engine-based simulation** for data augmentation to enhance detectability and localization performance.

Skills

- **Programming Languages:** Python, C/C++, MATLAB, LabVIEW
- **Frameworks and Libraries:** PyTorch, OpenCV, Open3D, MMDetection3D, ROS, Git
- **Visualization Tools:** CloudCompare, MeshLab, Weights and Biases
- **Hardware:** Oscilloscope, Function Generator
- **Language Skills:** Korean (Native), English (Proficient) - *IELTS Academic Overall: 7.5 / 9.0 (L: 8.5 / R: 8.0 / W: 6.5 / S: 7.0)*

Relevant Coursework

- **Machine learning:** Pattern Recognition, Theoretical Foundation of Machine Learning, Mathematical Foundation of Machine Learning, Matrix Methods in Machine Learning, Probability and Statistics, Random Data Analysis and Processing
- **Deep Learning:** Introduction to NLP
- **Computer Vision:** Mobile Robotics and Autonomous Navigation, Autonomous Mobile System Programming, Introduction to Visual Intelligence
- **Optimization:** Nonlinear Optimization

Educational Travel

- **ILSC Toronto English Language School** *Mar. 2019 – Dec. 2019*
  General and Academic English Courses Toronto, Canada
- **Pines International Academy** *Jan. 2019 – Mar. 2019*
  IELTS Academic Program Baguio, Philippines

Patents

- **Korean Patent Application Publication KR 10-2025-0171153 (Assignee: LG Innotek Co., Ltd.)**
  "*Data Generation Method, Data Learning Method, and Computing Device*," Inventors: Sungjin Cheong, Juseong Ha