

Seulgi Kim

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Education

Georgia Institute of Technology | Atlanta, GA, USA

Ph.D. in Electrical and Computer Engineering, minor in Computer Science

Aug. 2024 – Present

MS. In Electrical and Computer Engineering

Aug. 2023 – Aug. 2024

Seoul National University | Seoul, Korea

BS in Biosystems Engineering, minor in Computer Science

March 2016 - Feb. 2021

Research Interests

Multi-modal Learning, Computer Vision, Diffusion, Vision Language Model (VLM), Action Anticipation

Publications

Journal/Conference

1. **Kim, S.**, Zhang, J., Zhang, X., Ling, J., Shaw, R., 2026. *SpectralPID: Spectral Decomposition of Information in Vision-Language Models*. Submitted at ICLR
2. Yu, Y., **Kim, S.**, AlRegib, G., 2026. *Accelerating Ultra-Low-Bit Activation-Compressed Training via Signal-Propagation-Aware Initialization and Geometry-Conditioned Optimization*. Submitted at ICASSP
3. Jiang, T., **Kim, S.**, AlRegib, G., Anderson, D., 2026. *Modality Compensation via Explicit Audio-Visual Correspondence for Multi-Source Sound Localization*. Submitted at ICASSP
4. **Kim, S.**, Prabhushankar, M., AlRegib, G., 2026. *Intent Makes the Difference: Intention Diffusion for Action Anticipation*. Submitted at WACV
5. Kaviani, G., Yarici, Y., **Kim, S.**, Prabhushankar, M., AlRegib, G., Solh, M., Patil, A., 2026. *Hierarchical and Multimodal data for daily activity understanding*, DMLR [[Paper](#)] [[Youtube](#)] [[Project](#)]
6. **Kim, S.**, Prabhushankar, M., AlRegib, G., 2026. *Information Router for Mitigating Modality Dominance in Vision-Language Models*. ICIP [[Paper](#)]
7. Huang, J., **Kim, S.**, Liu, Y., Shen, Y., Zhu, H., Tiwari, P., Rudinac, S., Kanoulas, E., 2025, *A Novel Automatic Framework for Speaker Drift Detection in Synthesized Speech*. ICASSP [[Paper](#)]
8. **Kim, S.**, Kokilepersaud, K., Prabhushankar, M., AlRegib, G., 2025. *Countering Multi-modal Representation Collapse through Rank-targeted Fusion*. WACV [[Paper](#)] [[Youtube](#)] [[Project](#)]
9. **Kim, S.**, Kaviani, G., Prabhushankar, M., AlRegib, G., 2025. *Multi-level and Multi-modal Action Anticipation*. ICIP [[Paper](#)] [[Youtube](#)] [[Project](#)]
10. Kokilepersaud, K., **Kim, S.**, Prabhushankar, M., AlRegib, G., 2024. *HEX: Hierarchical Emergence Exploitation in Self-Supervised Algorithms*. WACV [[Paper](#)] [[Youtube](#)]

Patents

1. **S. Kim**, R. Kang, M. Son, H. Woo, D. Jeon, “Apparatus and Method for Determining a Position of an Object outside a Vehicle”, **US 18/ 538,386**, 2023.
2. **S. Kim**, M. Son, “Method and Apparatus for Multi-camera based Road Facility”, **KR 1020230178910**, 2023.
3. R. Kang, **S. Kim**, M. Son, H. Woo, D. Jeon, “Apparatus for Determining a Height of an object outside a vehicle and a Method for the same”, **US 18/ 505,816**, 2023.
4. **S. Kim**, R. Kang, M. Son, H. Woo, D. Jeon, “Method and Apparatus for Determining Vehicle Location based on License Plate Recognition”, **KR 1020230087663**, 2023.
5. **S. Kim**, R. Kang, M. Son, H. Woo, D. Jeon, “Apparatus for Determining of Object Position outside Vehicle and Method Thereof”, **KR 1020230071042**, 2023.
6. R. Kang, **S. Kim**, M. Son, H. Woo, D. Jeon, “Apparatus for Determining of Object Position outside Vehicle and Method Thereof”, **KR 1020230062646**, 2023.
7. **S. Kim**, Y. Kang, “Apparatus for Predicting a Driving Path of a Vehicle and a Method Thereof”, **US 18/ 142,677**, 2023.
8. **S. Kim**, Y. Kang, “Apparatus for Training a Path Prediction Model and a Method Thereof”, **US 18/ 136,687**, 2023.
9. **S. Kim**, “Apparatus for Detecting Label Errors in Training Datasets and Method Thereof”, **KR 1020230025347**, 2023.
10. **S. Kim**, Y. Kang, “Apparatus for Predicting Driving Path of Vehicle and Method Thereof”, **KR 1020220145334**, 2022.
11. **S. Kim**, Y. Kang, “Apparatus for Training Path Prediction Model and Method Thereof”, **KR 1020220145335**, 2022.
12. Y. Song, **S. Kim**, H. Lee, K. Nam, “Method for Controlling Seat Position based Learning”, **KR 1020210160162**, 2021.

Book

1. **S. Kim**, J. Park, “From the First to the Tenth Steps of Statistics (Across Mathematics, Computer Science, and Economics)”, Festbook, ISBN 979-11-92190-14-395140 (VOL 1), 2023. 4. 11.

Work Experience (Selected)**Amazon | Seattle, WA, USA**

May. 2026 – Aug. 2026

Applied Scientist Intern

- Research on VLM-as-a-judge with subtle visual defects, writing an ICLR paper.

Amazon | Austin, TX, USA

May. 2024 – Aug. 2024

Software Development Engineering (SDE) Intern

- Developed a generative AI model that auto-tag the root causes of 1000+ seller inquiries.
- Built a chatbot to be used by 100+ AWS Partner Organization (APO) developers using Claude 3 Sonnet LLM.
- Fixed the team's PSF pipelines; identified the root causes that cause failure and rolled out to production stages.

Hyundai Motors Company | Seoul, Korea

Feb. 2021 – Sep. 2023

Research Engineer / Autonomous Driving Software Development Team

- Represented real-world 3D structures to detect roads and road markers using monocular camera and 3D geometrics.
- Responsible for the entire perception pipeline for the Level 4 self-driving pilot service, including dataset creation, neural network implementation, post-processing with 3D camera geometry, and evaluation. Launched on Hyundai Robo-Taxi, Robo-Shuttle, and Robo-Trucks services. [[Youtube](#)]
- Received 12 Patents and an in-house conference reward (**Excellence Paper (Top 10)**, first author) by fusing the LiDAR and Camera modalities. [[Certificate](#)]
- Built a debugging monitor from scratch using Qt5 to communicate with embedded systems via TCP/IP.
- Processed raw data acquired from camera, LiDAR, and CAN bus sensors to train AI models.

Research Projects**Can VLMs Understand Fine-grained Actions in Video? / Georgia Tech**

Aug. 2025 – Present

- Fine-tuned VLM's chain-of-thought process with reinforcement learning for fine-grained action anticipation.
- Design reinforcement learning algorithms for capturing fine-grained actions in Video.

Do Vision Language Action (VLA) Models Lack Basic Reasoning? [[PDF](#)] / Georgia Tech

May. 2025 – Aug. 2025

- Co-Fine-tuned VLA models using a mixture of VQA and robotics dataset to improve reasoning capabilities.
- Evaluated on downstream robotics tasks within the LIBERO evaluation suite, improving action accuracy.

DARai: Human Action Activity Dataset [[Project](#)] / Georgia Tech

Aug. 2024 – April. 2025

- Created the human activity dataset from scratch to support research in activity recognition/anticipation tasks.

ADAS Production Car Development [[Youtube](#)] / Hyundai Motors Company

Feb. 2021 – Sep. 2023

- Tested, integrated, and embedded our team's AI models and detection algorithms into NVIDIA chips.
- Rectified localization error and enhanced distance estimation using a single camera, slated for 2025 release.

Teaching Experience**Graduate Teaching Fellow / Georgia Institute of Technology**

Jan. 2025 – May. 2025

Graduate Teaching Assistant / Georgia Institute of Technology

Jan. 2024 – Dec. 2024

- Developed ECE 2806 (AI First) course content from scratch to be given to undergraduate students.
- Lectured ECE2806 (AI First) Lab class and Recitation class for 2nd year undergraduate students.

Honors and Awards (Selected)**2025 GTA Excellence Award / Georgia Tech Roger P. Webb Awards Program**

March. 2025

- 1,000 dollars and plaque as an outstanding GTA (Top 3). [[Link](#)]

2025 Outstanding GTA award / Georgia Institute of Technology

March. 2025

- Outstanding GTA (Top 1) in ECE department.

Research Scholar / Hyundai Motors Company

Jan. 2020 – Dec. 2020

- Full tuition and stipend for 1 year. [[Project demo](#)]

Merit-based Scholarship (7 semesters) / Seoul National University

Jan. 2017 – Dec. 2020

- Merit-based scholarship for 7 semesters throughout the undergraduate.

Skills

C++, Python, C, MATLAB, R, Java, OCaml, PHP, Open3D, CAN, TCP/IP, PyTorch, Tensorflow, TensorRT, Keras, Cuda Programming, OpenMP, OpenGL, AWS, Git, JIRA, Docker, Raspberry PI, Arduino, Android Studio, SolidWorks