

Doeon Kim

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Soongsil University, Seoul, 06978, Republic of Korea

RESEARCH INTERESTS

Wireless/RF sensing and physics-grounded machine learning. I aim to turn ambient radio signals, especially WiFi Channel State Information (CSI), into reliable human and scene perception systems, and to use ray-tracing-based RF simulation to study sim-to-real generalization across environments, devices, and deployment conditions.

EDUCATION

Soongsil University

Seoul, Korea

M.S. in Intelligent Semiconductors

Mar. 2024 – Feb. 2026

Soongsil University

Seoul, Korea

B.E. in AI Convergence

Mar. 2019 – Feb. 2024

PUBLICATIONS

Published and Accepted Papers

1. **D. Kim***, J. Lee*, S. Kim, and S. Kim, “WiFi-JEPA: Self-supervised Learning for WiFi-CSI 3D Human Pose Estimation,” *European Conference on Computer Vision (ECCV)*, 2026.
2. J. Lee, **D. Kim**, and S. Kim, “Generative Traffic Video Forecasting with Paired Future Descriptions via Parameter-Efficient World Model Adaptation,” 10th AI City Challenge Workshop at ECCV 2026, Oral.
3. **D. Kim***, D. Park*, J. Seo, H. Cho, S. Ahn, N. Kang, and S. Kim, “Estimation of Electromagnetic Field Strength: Experiments Using Vision Transformers,” *IEEE Access*, vol. 13, 2025.
4. **D. Kim** and S. Kim, “Multimodal Physical Data Fusion using ViT for 5G Electromagnetic Field Estimation,” *Proceedings of Conference on Electronics and Information Communications (CEIC)*, 2025.
5. Y. Han, S. Lee, M. Byoun, K. Kim, **D. Kim**, S. Oh, and J. Kim, “Translating Text in Wild: Natural Image Translation System Implementation based on PaddleOCR and SRNet++,” *Annual Conference of KIPS*, 2025.
6. S. Kwon*, **D. Kim***, G. Lim*, Y. Han, and S. Kim, “Tiny Object Detection Method Based on Cross-Attention of Heterogeneous Feature Maps,” *Proceedings of KIIS Autumn Conference*, 2024.

Preprints and Papers Under Review

1. **D. Kim**, D. Park, S. Ahn, N. Kang, S. Kim, and S. Kim, “Multi-Modal Conditioned High-Resolution Transformer for Urban Electromagnetic Field Map Prediction,” *arXiv:2606.27671*, 2026.
2. H. Choi, **D. Kim**, and S. Kim, “PAMFormer: Propagation-Aware Multimodal Pretraining for Radio Map Estimation,” *under review*, 2026.
3. S. Zheng, H. He, J. Li, X. Lu, **D. Kim**, J.-H. Choi, J. Zeng, S. He, and Y. Guan, “Physics-Bounded mmWave Sensing for Schedulable, Privacy-Preserving Human Pose Estimation,” *under review IEEE Transactions on Mobile Computing*, 2026.
4. J. Lee, G. Lim, **D. Kim**, and S. Kim, “Multi-Agent Target-Existence Verification and Learned Mask Geometry Refinement: Winning Report of the MeViS-Text Track at the 8th LSVOS Challenge 2026,” *arXiv:2608.11458*, 2026.

PATENTS

- **D. Kim**, J. Lee, S. Kim, and S. Kim, “Structure-Aware Self-Supervised Learning and Link Masking-Based 3D Human Pose Estimation System and Method Using WiFi Channel State Information,” Korean Patent Application No. 10-2026-0102154, filed Jun. 5, 2026 (pending).
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RESEARCH EXPERIENCE

Full-time Researcher, supervisor: Prof. Seongheum Kim

VIP Lab

Cross-Domain Wireless Sensing with RF Simulation

May 2026 – Present

- Studying cross-domain generalization in WiFi-CSI sensing and exploring its extension to mmWave radar perception through RF simulation.

Graduate Researcher, advisor: Prof. Seongheum Kim

VIP Lab

WiFi-JEPA: Self-Supervised Learning for WiFi-CSI 3D Human Pose Estimation

Dec. 2025 – May 2026

- Proposed WiFi-JEPA, a CSI-native self-supervised framework that learns WiFi-CSI representations by predicting masked latent embeddings instead of reconstructing raw CSI.
- Designed structure-aware CSI tokenization and link masking, and built a Sionna RT-based pipeline for generating diverse pretraining data from randomized geometric primitives.
- Achieved 76.8 mm single-person and 93.5 mm multi-person MPJPE on Person-in-WiFi-3D (PiW3D), reducing cross-environment error by 48% relative to the PiW3D baseline.

Graduate Researcher, advisor: Prof. Seongsin Kim

SmartAILab

Physics-Informed RF Propagation Modeling for 5G Base Stations

Jan. 2025 – May 2026

(Collaborative project with KAIST; supported by MSIT/IITP and NRF G-LAMP.)

- Formulated 5G electromagnetic-field and radio-map estimation from ray-tracing-generated geospatial data as a physics-informed dense prediction task.
- Designed multimodal inputs encoding building maps, antenna radiation patterns, and base-station parameters, and benchmarked Vision Transformer architectures against CNN baselines.
- Developed Spatial Mapping and Token Fusion strategies, reducing masked MAE by up to 60% and improving PSNR by 57% relative to HRFormer.

Domain-Adaptive Satellite AI for Child-Center Site Prioritization

Sep. 2025 – Present

- Developed a multi-scale ConvNeXt-based satellite-image classifier to rank candidate sites for child centers in a label-scarce target region under sparse labels and coordinate uncertainty.
- Adapted a globally pretrained remote-sensing model to the unseen target-domain imagery, achieving 0.959 AP and 0.862 F1 on geo-disjoint blind-test regions.

Tiny Object Detection in Aerial Imagery via Heterogeneous Feature-Map Fusion

Mar. – Dec. 2024

- Collaborated with Vision Lab (Prof. Youngjun Han) to develop a cross-attention module that fuses segmentation and detection features for tiny-object detection in aerial imagery.
 - Improved Faster R-CNN on AI-TOD from 40.03 to 43.80 mAP@0.5 and from 18.72 to 23.10 mAP@0.5:0.95.
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HONORS AND AWARDS

- **1st Place**, MeViSv2-Text Track, 8th LSVOS Challenge, ECCV 2026 Workshop.
- **2nd Place**, Track 5: Generative Traffic Video Forecasting, 10th AI City Challenge, ECCV 2026 Workshop.

- **2nd Place**, IEEE Low-Power Computer Vision Challenge, ECV Workshop at CVPR 2026 (\$3,000 prize)
- **Chairman’s Award**, SW-Centered University Joint AI Competition, Ministry of Science and ICT, South Korea, 2023 (4th/220)

ADDITIONAL PROFESSIONAL EXPERIENCE

NaraeTrend (Bucheon, Korea) Jul. 2025 – Dec. 2025
Researcher, Industry–University Collaboration
High-Resolution Tiny Pest Detection Framework

- Developed a YOLO-based crop-and-detect pipeline that preserves fine-grained details for detecting 1–3 mm pests in high-resolution imagery.

Jian Advisory (Seoul, Korea) Sep. 2024 – Feb. 2025
External Researcher
Watchlist Filtering Model for Financial Compliance

- Developed a BERT/CharacterBERT-based name-matching pipeline for financial watch-list filtering.
- Combined character-level representation learning with rule-based filtering to handle name variations and noisy text records.

TEACHING EXPERIENCE

Teaching Assistant, Soongsil University 2024 – 2025
Programming and Practice Fall 2025, Spring 2024
Capstone Design Spring 2025
Advanced Programming and Practice Spring 2025
Probability and Statistics Fall 2024

Held office hours and Q&A sessions, graded assignments, and supported student projects.

SKILLS

Languages: Korean – Native, English – Conversational
Programming: Python, C, C++
Frameworks and Tools: PyTorch, Sionna RT, OpenCV, NumPy, Pandas, Matplotlib