Hyeongyu **Kim**

Ph.D. | Test-Time Adaptation & Reliable ML

Republic of Korea

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Education

Yonsei University — *Seoul, South Korea*
Ph.D. in Electrical and Electronic Engineering — *Mar. 2020 – Aug. 2026*
- Advisor: Prof. Dosik Hwang; Fellow Scholarship. Degree awarded 28 August 2026.

Yonsei University — *Seoul, South Korea*
B.S. in Electrical and Electronic Engineering — *Mar. 2014 – Feb. 2020*

Professional & Research Experience

Hyundai Motor Company — *South Korea*
Compiler Engineer, Compiler Team — *Aug. 2026 – Present*
- Develop TVM-based compilation for custom-NPU deployment (Relax/TIR lowering, tiling, scheduling, memory mapping), with HW/SW co-design to balance latency, bandwidth, throughput, and power.

Medical Artificial Intelligence Lab, Yonsei University — *Seoul, South Korea*
Doctoral Researcher; Advisor: Prof. Dosik Hwang — *Mar. 2020 – Aug. 2026*
- Test-time adaptation, domain adaptation/generalization, and robust deployment under distribution shift.
- Developed activation-aware adaptation (AcTTA), modular buffer layers, and mutual-information-guided calibration/adaptation (MIRA); co-developed CD-Buffer for adverse-weather object detection.
- Cross-modality 3D segmentation, multi-contrast MRI restoration, and diffusion-based medical image synthesis; CrossMoDA 2021 winning team.

Research Interests

Test-time Learning	Test-time adaptation, calibration, unsupervised domain adaptation, domain generalization
Reliable Deployment	Robust prediction under distribution shift; efficient inference and hardware-aware model deployment
Medical Imaging	3D segmentation, multi-contrast MRI restoration/synthesis, diffusion and flow matching

Technical Skills

Programming	Python, C/C++, MATLAB
ML Frameworks	PyTorch, TensorFlow, CUDA, OpenCV
Compilers / Tools	TVM (Relax, TIR), Git, Docker, Linux
Languages	Korean, English

Honors & Awards

International

2026	**Outstanding Reviewer**, IEEE/CVF Conference on Computer Vision and Pattern Recognition	*CVPR 2026*
2024	**4th Rank**, MICCAI Challenge on Aorta Segmentation	*MICCAI 2024 Challenge*
2021	**1st Rank**, Cross-Modality Domain Adaptation for Medical Image Segmentation (CrossMoDA-2021 challenge)	*MICCAI 2021 Challenge*

Domestic

2021	**Excellence Award**, Hackathon of Development of AI-based Image Diagnosis using Medical Big Data 2021, Ministry of Trade, Industry and Energy	*Seoul, South Korea*
2021	**Excellence Award**, 2021 Medical Data AI Datathon, Ministry of Science and ICT and the National Information Society Agency.	*Seoul, South Korea*

Publications: Journals

Automatic segmentation and modeling of the aortic vessel tree: Overview of the SEG.A 2023 aorta segmentation challenge

Yuan Jin, Antonio Pepe, Gian Marco Melito, Yuxuan Chen, Gege Ma, Yunsu Byeon, Hyeseong Kim, Kyungwon Kim, Doohyun Park, Euijoon Choi, Dosik Hwang, Andriy Myronenko, Dong Yang, Yufan He, Daguang Xu, Ayman El-Ghotni, Mohamed Nabil, Hossam El-Kady, Ahmed Ayyad, Amr Nasr, Marek Wodzinski, Henning Müller, **Hyeongyu Kim**, Yejee Shin, Abbas Khan, Muhammad Asad, Alexander Zolotarev, Caroline Roney, Anthony Mathur, Martin Benning, Gregory Slabaugh, Theodoros Panagiotis Vagenas, Konstantinos Georgas, George K Matsopoulos, Jihan Zhang, Zhen Zhang, Liqin Huang, Christian Mayer, Heinrich Mächler, Jan Egger

Medical Image Analysis; online first 17 September 2026. DOI: 10.1016/j.media.2026.104324 2026

MinT: Magnetic resonance image unsupervised translation via decoupling anatomical structure and contrast

Hanbyeon Jang, **Hyeongyu Kim**, Sewon Kim, Dosik Hwang

Computers in Biology and Medicine 2025

CrossMoDA 2021 challenge: Benchmark of cross-modality domain adaptation techniques for vestibular schwannoma and cochlea segmentation

Reuben Dorent, Aaron Kujawa, Marina Ivory, Spyridon Bakas, Nicola Rieke, Samuel Joutard, Ben Glocker, Jorge Cardoso, Marc Modat, Kayhan Batmanghelich, Arseniy Belkov, Maria Baldeon Calisto, Jae Won Choi, Benoit M. Dawant, Hexin Dong, Sergio Escalera, Yubo Fan, Lasse Hansen, Mattias P. Heinrich, Smriti Joshi, Victoriya Kashtanova, **Hyeon Gyu Kim**, Satoshi Kondo, Christian N. Kruse, Susana K. Lai-Yuen, Hao Li, Han Liu, Buntheng Ly, Ipek Oguz, Hyungseob Shin, Boris Shirokikh, Zixian Su, Guotai Wang, Jianghao Wu, Yanwu Xu, Kai Yao, Li Zhang, Sébastien Ourselin, Jonathan Shapey, Tom Vercauteren

Medical Image Analysis 2023

Publications: Conferences

* Equal contribution / co-first authors.

MIRA: Mutual Information guided calibration for Reliable Test-Time Adaptation

Hyeongyu Kim*, Mingyeong Jang*, Youngjun Song, GeonHui Han, Dosik Hwang

NeurIPS 2026; accepted 2026

AcTTA: Rethinking Test-Time Adaptation via Dynamic Activation

Hyeongyu Kim*, Geonhui Han*, Dosik Hwang

CVPR 2026, pp. 22217–22226 2026

CD-Buffer: Complementary Dual-Buffer Framework for Test-Time Adaptation in Adverse Weather Object Detection

Youngjun Song, **Hyeongyu Kim**, Dosik Hwang

CVPR 2026; Highlight 2026

Buffer layers for Test-Time Adaptation

Hyeongyu Kim*, Geonhui Han*, Dosik Hwang

NeurIPS 2025 2025

Publications: Conferences (continued)

Anatomical Consistency and Adaptive Prior-informed Transformation for Multi-contrast MR Image Synthesis via Diffusion Model

Yejee Shin, Ye eun Lee, Hanbyol Jang, Geonhui Son, **Hyeongyu Kim**, Dosik Hwang

CVPR 2025 2025

Self-Supervised Isotropic MRI Volume Restoration from Complementary Contrast-Plane Acquisition using Two-Phase Fast Score-based Models

Hyeongyu Kim, Youngjun Song, Tolga Çukur, Dosik Hwang

ISMRM 2025 2025

Anatomy-Matching based Multi-contrast MR Super-resolution

Hyeongyu Kim, Hyungseob Shin, Youngjun Song, Dosik Hwang

ISMRM 2024 2024

Position-Encoded Pixel-to-Prototype Contrastive Learning for Aortic Vessel Tree Segmentation

Hyeongyu Kim, Yejee Shin, Dosik Hwang

MICCAI 2023 SEG.A Challenge workshop; proceedings published 2024 2023 / 2024

DiMix: Disentangle-and-Mix based domain generalizable medical image segmentation

Hyeongyu Kim*, Yejee Shin*, Dosik Hwang

MICCAI 2023 2023

SDC-UDA: Volumetric Unsupervised Domain Adaptation Framework for Slice-Direction Continuous Cross-Modality Medical Image Segmentation

Hyungseob Shin*, **Hyeongyu Kim***, Sewon Kim, Yohan Jun, Taejoon Eo, Dosik Hwang

CVPR 2023 2023

Deep residual network with data consistency for subsampled Fourier ptychographic microscopy

Hyeongyu Kim, Kyungwon Kim, Kyungchul Lee, Taejoon Eo, Seungah Lee, Dosik Hwang

SPIE Photonics West, Quantitative Phase Imaging; oral presentation 2021

Preprints

COSMOS: Cross-Modality Unsupervised Domain Adaptation for 3D Medical Image Segmentation based on Target-aware Domain Translation and Iterative Self-Training

Hyungseob Shin*, **Hyeongyu Kim***, Sewon Kim, Yohan Jun, Taejoon Eo, Dosik Hwang

*arXiv preprint; * co-first authors* 2022

Industry & Clinical Projects

Samsung Medison / Severance Hospital *South Korea*

Fetal Ultrasound Image Enhancement *2025*

- Developed diffusion- and flow-matching-based enhancement for denoising, super-resolution, and artifact suppression without high-resolution reference data.

Samsung Electronics *South Korea*

MRI-based Alzheimer's Disease Diagnosis *2023*

- Developed a cyclic inference-based diagnostic algorithm using brain MRI; patent application recorded as DP-2023-0002.

Pediatric medical imaging data project *South Korea*

Pediatric Chest X-ray Dataset & Disease Detection *2023*

- Constructed a pediatric chest X-ray dataset and trained models for lung disease detection.

Rayence *South Korea*

Automated Spinal Analysis *2021*

- Developed vertebral segmentation and spinal curvature/Cobb angle analysis from X-ray imaging.

Patents

2025	**Artificial neural network apparatus and test-time adaptation method for inference**, Application, DP-2025-0773	*South Korea*
2025	**Isotropic MRI volume reconstruction apparatus and method**, Application, DP-2024-1961	*South Korea*
2024	**Apparatus and method for generating multi-contrast magnetic resonance images**, Application, DP-2024-0932	*South Korea*
2023	**Dementia diagnosis system and control method based on cyclic inference-driven artificial intelligence**, Application, DP-2023-0002	*South Korea*
2023	**Domain-generalized segmentation model training method**, Application, DP-2023-1013	*South Korea*

Scholarships

2024	**Research Scholarship**, Hyundai Motor Group	*South Korea*
2020	**Fellow Scholarship**, Yonsei University	*South Korea*
2021	**International Collaborative Research Scholarship**, Yonsei University	*South Korea*

Teaching Experience

Yonsei University *Seoul, South Korea*

Teaching Assistant *Mar. 2020 - Jun. 2020*

- Introduction to Bioengineering for Electrical and Electronic Engineering