Curriculum Vitae

Se-Hyeon Hwang

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RESEARCH INTERESTS

Trustworthy Medical AI; Clinical Evidence Auditing; Interpretable & Auditable Model Design; Medical Imaging.

Research focus: evaluating whether diagnostic models rely on clinically meaningful evidence, and developing models with directly inspectable evidence pathways.

EDUCATION

Ajou University Feb 2026 – Feb 2028 (Expected)
M.S. in AI Convergence Network

- Advisor: Prof. Jung-Won Lee

Ajou University Mar 2020 – Feb 2026
B.S. in Electrical and Computer Engineering · Microdegree in Data Science & AI

- Advisor: Prof. Jung-Won Lee

PUBLICATIONS

Peer-Reviewed Conference Papers (domestic, in Korean)

- **C2: S. Hwang**, J. Kim, M. Choi, & J. Lee (2026). Design of Monitoring Software for Predictive Maintenance in Smart Factory. *Proc. 28th Korea Conference on Software Engineering (KCSE)*, 28(1), 211–218.
- **C1: S. Hwang**, H. Choi, J. Kim, & J. Lee (2025). Requirements Analysis of Data and Model for Reliability of Ultrasound-based Diagnostic Model. *Proc. Annual Conference of KIPS (ACK)*, 32(2), 489–490.

Manuscripts in Preparation

- **M2: Auditing clinical evidence alignment in ultrasound diagnostic models.** Retraining-free analysis of whether trained models rely on clinically valid evidence rather than shortcut cues. *(Manuscript in preparation.)*
- **M1: An auditable diagnostic framework for hepatobiliary ultrasound.** Clinical-cue channels with independent model branches and exact channel-level Shapley attribution for directly traceable evidence use. *(Manuscript in preparation.)*

Software Registration

- **S1:** *A Tool for Removing Diagnostic Markers and Restoring Medical Images*, Korea Copyright Commission, Reg. No. ASSET_0013931. Removes embedded diagnostic markers from medical images while preserving image content for downstream analysis.

RESEARCH EXPERIENCE

Graduate Researcher, *Embedded & Software Lab (ESL) / MIIDS Research Center, Ajou University* Feb 2026 – Present
MSIT-funded University ICT Research Center (ITRC)

- Conducting M.S. research on trustworthy medical AI, including post-hoc auditing of evidence use in trained models and auditable diagnostic model design (M2, M1).
- Evaluating model evidence using frequency-band, attention, and attribution analyses across CNN, transformer, graph, and wavelet-based classifiers.

Undergraduate Researcher, *ITRC Project on Gallbladder Ultrasound AI* Jan 2025 – Feb 2026
MIIDS Research Center, Ajou University

- Contributed to an MSIT-funded project on AI-based gallbladder ultrasound diagnosis in collaboration with Ajou University Hospital; the work continued into my M.S. research.
- First-authored a reliability requirements study reporting a **~33% improvement in malignant-class detection sensitivity** (C1).
- Developed clinical-knowledge-guided modeling strategies using echogenicity, texture, lesion margin, wall features, and anatomical context.
- Presented center research at the ITRC Talent Development Fair in 2025 and 2026.

RESEARCH EXPERIENCE (continued)

Graduate Researcher, *Diagnostic Prediction via Robotic Motion Anomaly Detection* Dec 2025 – Nov 2026
Embedded & Software Lab (ESL), Ajou University — funded by Samsung Heavy Industries

- Developing machine learning models for robotic motion anomaly detection and equipment fault prediction in smart-factory systems; first-authored a monitoring-software design paper based on international reliability standards (C2).

Undergraduate Research Intern, *Dept. of Psychiatry, Ajou University Medical Center* May 2024 – Dec 2024

- Participated as an external researcher in a government-funded, IRB-approved computational psychiatry project involving clinical research workflows and clinical data handling; supervised by Prof. Taewi Kim.

Research Assistant, *Energy Center, Ajou University* Jan – Dec 2021

- Operated XRD and IR spectroscopy equipment and analyzed samples for university and industry collaborators.

TEACHING EXPERIENCE

Teaching Assistant → Head Teaching Assistant, *Logic Circuit Laboratory, Ajou University* Mar 2026 – Present

- Supervise undergraduate digital logic labs — circuit troubleshooting, team projects, and grading.
- Student evaluation: **4.77 / 5.00 (95.4%)**, Spring 2026.
- Appointed **Head TA** for Fall 2026; train and coordinate the course's teaching assistants.

Undergraduate Research Mentor, *Convergence Electronics Research, Dept. of ECE, Ajou University* Jan – Dec 2026

- Mentored an undergraduate research project on ultrasound image segmentation model design and experiments.

SELECTED PROJECTS & COMPETITIONS

Self-Supervised ECG Anomaly Detection Framework — *ICT Challenge 2026* Jan – Dec 2026

- Designing, training, and optimizing lightweight self-supervised models for ECG anomaly detection.

Explainable Diagnostic Framework for Gallbladder Polyp Classification — *ICT Challenge 2025* 2025
Undergraduate capstone project · Team leader · also presented at the Industry–Academia Fair

- Developed a clinically guided ultrasound classifier using lesion margin, contrast, and liver–gallbladder echogenicity difference as explicit model features.
- Achieved **93% overall accuracy and 0.90 malignant-class F1** on a public dataset.

Conquer Health Hackathon — *Medical Science Foundation Models, hosted by Lunit* Aug 2026
Team of 2 · system designer and presenter

- Designed *Control Plane for a Frozen Clinician*: an orchestration harness that controls a frozen medical foundation model (Lunit L2) with risk-adaptive clinical-evidence retrieval and source-cited answers, without retraining.
- Evaluated on HealthBench-based clinical dialogue tasks; presented at the final session.

AWARDS

Encouragement Award, ECE Industry–Academia Fair, Ajou University Dec 2025
Individual entry · 84 teams competed

Social Value Award (Special Award), 2025 Capstone Design Competition, Ajou University Nov 2025
Team leader · 1 of 12 awarded teams

SKILLS

Programming. Python, PyTorch, PyTorch Geometric, Linux, Git

Machine Learning. CNNs, vision transformers, graph neural networks, self-supervised learning

Trustworthy AI. Shortcut analysis, attribution analysis, frequency-band analysis, model auditing

Medical Imaging. Ultrasound imaging, clinical-factor analysis, superpixel-based image representation

Languages. Korean (native); English (IELTS scheduled)

PROFESSIONAL TRAINING

- **Digital Healthcare AI Solution Development and Industry Field Experience** — Center for Artificial Intelligence in Healthcare, Seoul National University Bundang Hospital, Aug 2024.
- **Convergence Security Workforce Training — Smart Healthcare (Basic)**, 21 hours — Korea Information Security Industry Association (KISIA), Ministry of Science and ICT, Jul 2024.

COMMUNITY SERVICE & MILITARY

Community Outreach Volunteer, *Sillim-dong, Seoul* Mar 2026 – Present

Sergeant, Republic of Korea Air Force — 15th Special Mission Wing, honorably discharged Mar 2022 – Dec 2023