

# Juho Jung

+82 10-5955-5457    zuho.jung@gmail.com    juho-jung.github.io  
Google Scholar    Juho-Jung    juhojung98

## RESEARCH STATEMENT

When a medical foundation model improves after adaptation, we rarely know *why*. My research asks whether that improvement comes from acquiring the visual evidence a clinician would rely on, or from shortcuts that collapse under site shift. I work on adapting chest imaging foundation and vision-language models under extremely scarce labels and multi-site distribution shift, and on building *non-circular* validation protocols that separate genuine evidence acquisition from spurious gains. My goal is to make the adaptation of medical foundation models a measurable science.

**Keywords:** Medical Vision-Language Models | Label-Efficient Adaptation | Uncertainty Quantification & Calibration | Evidence Grounding & Interpretability | Distribution Shift in Clinical Imaging

## EDUCATION

**Sungkyunkwan University**, Seoul, Korea Sep 2022 – Aug 2024  
M.S. in Applied Artificial Intelligence | GPA 4.33/4.5  
Advisor: Prof. Jinyoung Han. Full Academic Excellence Scholarship.

**Carnegie Mellon University**, Pittsburgh, PA, USA Aug 2023 – Feb 2024  
Visiting Scholar, School of Computer Science | GPA 3.7/4.0  
Intensive Program in AI (IITP). Hosts: Z.-Q. Cheng, A. Hauptmann, D. Mortensen.

**Sungkyunkwan University**, Seoul, Korea Mar 2019 – Aug 2022  
B.S. in Applied Artificial Intelligence; B.S. in Engineering | GPA 4.02/4.5  
*Magna Cum Laude*. Full Scholarship.

## RESEARCH EXPERIENCE

**VUNO Inc.** — AI Research Scientist Nov 2024 – Present  
Alternative Military Service, Technical Research Personnel

*Chest Radiography*

- **Label-efficient annotation.** Spatially adaptive active learning that balances predictive uncertainty against anatomical coverage for CXR lesion segmentation, together with spatial evaluation metrics that expose region-level blind spots.
- **Multi-task acquisition.** Orthogonal decomposition of gradient conflict, selecting the samples that yield the greatest joint gain across task branches rather than penalizing conflict.
- **Few-shot foundation model adaptation.** Adapting chest imaging foundation models to unseen sites, unseen findings, and rare lesions under few-shot supervision.

*Chest CT*

- **Label-efficient adaptation.** Anatomical pseudo-labeling for mediastinal lesion detection in chest CT, targeting findings with extremely limited annotation.
- **Vision-language adaptation.** Zero-shot classification pipelines pairing CT volumes with clinical reports for abnormality detection without task-specific labels.
- **Deployed research.** Volumetric super-resolution module for low-quality CT, shipped as part of VUNO Med<sup>®</sup>-LungCT AI<sup>™</sup>.
- **Infrastructure.** 3D DICOM parsing and handling; containerized model deployment on L4/T4 GPUs.

*Interpretable Medical Imaging*

- **Concept grounding.** Lesion-guided concept distillation that spatially grounds clinical concepts using segmentation masks at training time only, keeping inference mask-free. Evaluated on retinal OCT and dermoscopy.

**Medipixel Inc.** — Machine Learning Research Engineer

Apr 2024 – Nov 2024

- Multi-task framework for coronary angiography video: lesion detection, vessel-type classification, and disease localization within a single model.
- Designed and refined clinical evaluation metrics; led DICOM preprocessing and code review.

**Carnegie Mellon University**, School of Computer Science — Visiting Researcher

Sep 2023 – Feb 2024

- Explainable AI for audio-visual deepfake detection: modality-wise attribution of which stream and which segment drives a decision (IITP-funded).
- Heterogeneous graph neural networks for electronic health records on MIMIC.

**Elevenlitter Inc. (Lifet)** — Co-Founder, AI Researcher

Feb 2022 – Sep 2022

Pet healthcare startup

- Single-image disease detection and segmentation under tight parameter budgets; deployed to web and mobile. Basis for three granted Korean patents.

**Data Science & Artificial Intelligence Lab**, Sungkyunkwan University — Graduate Researcher

Sep 2022 – Aug 2024

- Uncertainty-aware multi-task learning for retinal OCT; clinical decision support for retinal disease with explainable AI (NRF Korea).
- Multimodal representation learning for depression detection and deepfake video detection.

## PUBLICATIONS

---

† equal contribution   \* corresponding author   **bold** = author

### Under Review

#### **Deconstructing Multi-Task Active Learning: Orthogonal Decomposition of Gradient Conflict**

J. Jung<sup>†</sup>, [co-authors]

*NeurIPS 2026* | under review

#### **Spatially Adaptive Regional Coverage for Active Learning in Chest X-ray Analysis**

J. Jung<sup>†</sup>, [co-authors]

*IEEE Transactions on Medical Imaging* | under review

#### **Automated Structured Radiology Report Generation with Rich Clinical Context**

S. Kang<sup>†</sup>, D. B. Lee<sup>†</sup>, J. Jung, D. Kim, W. H. Kim, S. Joo

*EMNLP 2026* | under review | arXiv:2510.00428

#### **Deep Learning-Based Model for Automatic Detection of Mediastinal Abnormal Lesions in Chest CT Scans**

J. Jung<sup>†</sup>, [co-authors]

*Respirology* | under review | IF 6.6

### Peer-Reviewed Conference & Journal Papers

#### **CAMEL: Confidence-Aware Multi-Task Ensemble Learning with Spatial Information for Retina OCT Image Classification and Segmentation**

J. Jung<sup>†</sup>, M. Yang<sup>†</sup>, H. Won, J. Kim, J. M. Han, J. S. Hwang, D. D.-J. Hwang, J. Han

*WACV 2025*

#### **HiQuE: Hierarchical Question Embedding Network for Multimodal Depression Detection**

J. Jung, C. Kang, J. Yoon, S. Kim, J. Han\*

*CIKM 2024* | Oral

#### **Prediction of Neovascular Age-Related Macular Degeneration Recurrence Using Optical Coherence Tomography Images with a Deep Neural Network**

J. Jung<sup>†</sup>, J. Han, J. M. Han, J. Ko, J. Yoon, J. S. Hwang, J. I. Park, G. Hwang, J. H. Jung, D. D.-J. Hwang

*Scientific Reports 2024* | IF 4.6

## Anti-VEGF Treatment Outcome Prediction Based on Optical Coherence Tomography Images in Neovascular Age-Related Macular Degeneration Using a Deep Neural Network

[first author], J. Jung, [remaining co-authors]

*Scientific Reports* 2024 | IF 4.6

## ISOML: Inter-Service Online Meta-Learning for Newly Emerging Network Traffic Prediction

M. Kang<sup>†</sup>, J. Jung<sup>†</sup>, M. Cho, D. Choi\*, E. Park, S. Pack, J. Han\*

*ACM MobiSys* 2024

## SAFE: Sequential Attentive Face Embedding with Contrastive Learning for Deepfake Video Detection

J. Jung, C. Kang, J. Yoon, S. S. Woo, J. Han\*

*CIKM* 2023

## Detecting Medial Patellar Luxation with Ensemble Deep Convolutional Neural Network Based on a Single Rear View Image of the Hindlimb

J. Jung<sup>†</sup>, G. Park<sup>†</sup>, G. Kim\*

*Scientific Reports* 2023 | IF 4.6

## Workshop Papers & Conference Abstracts

### Deep Learning-Based Automatic Detection of Mediastinal Abnormal Lesions in Chest CT Using Anatomical Pseudo-Labeling

J. Jung, [co-authors]

*KATRD International Conference* 2025

### Improved Deep Learning-Based CAD System for Usual Interstitial Pneumonia Classification in Chest HRCT

[first two authors], J. Jung, [remaining co-authors]

*Korean Congress of Radiology* 2025

### WWW: Where, Which and Whatever — Enhancing Interpretability in Multimodal Deepfake Detection

J. Jung<sup>†</sup>, S. Lee<sup>†</sup>, J. Kang<sup>†</sup>, Y. Na<sup>†</sup>

*Trustworthy AI Workshop @ IJCAI* 2024

### GraphEHR: Heterogeneous Graph Neural Network for Electronic Health Records

J. Jung<sup>†</sup>, M. Choe<sup>†</sup>, K. Agarwal<sup>†</sup>, N. Dhanasekaran<sup>†</sup>

*AI for Critical Infrastructure Workshop @ IJCAI* 2024

## Preprints

### Enhancing Temporal Action Localization: Advanced S6 Modeling with Recurrent Mechanism

S. Lee, J. Jung, C. Oh, S. Yun\*

*arXiv:2407.13078*, 2024

## SELECTED PROJECTS

---

### LUNA25 Grand Challenge — Lung Nodule Malignancy Risk Estimation

Mar 2025 – Sep 2025

7th place out of 56 teams (1,035 participants). Deep learning pipeline for malignancy risk estimation from low-dose chest CT.

### Explainable AI for Audio-Visual Deepfake Video Detection

Sep 2023 – Feb 2024

Carnegie Mellon University; IITP. Modality- and segment-level attribution for multimodal forgery detection.

### Clinical Decision Support System for Retinal Disease Detection with Explainable AI

Mar 2023 – Feb 2024

National Research Foundation of Korea (NRF). OCT-based recurrence and treatment-response prediction with clinician-facing explanations.

### Heterogeneous Graph Neural Network for Electronic Health Records

Sep 2023 – Dec 2023

Carnegie Mellon University (11-785 Introduction to Deep Learning). Relational modeling of MIMIC clinical events.

### Pet Healthcare Platform with AI and LLMs

Feb 2022 – Sep 2023

Lifet. Single-image disease detection and segmentation deployed to web and mobile, with LLM-based user interaction.

|                                                                                               |                     |
|-----------------------------------------------------------------------------------------------|---------------------|
| <b>Content Planning and Human-AI Interaction Design for AI-Based Digital Therapy Services</b> | Jun 2022 – Nov 2022 |
| National Research Foundation of Korea (NRF).                                                  |                     |
| <b>Study on Self-Driving B5G Networks Towards Federated Private-5G</b>                        | Jun 2021 – Aug 2024 |
| National Research Foundation of Korea (NRF), funded by MSIT.                                  |                     |
| <b>User-Centered Artificial Intelligence for Service Design</b>                               | Jul 2020 – Jul 2024 |
| Institute for Information & Communications Technology Planning & Evaluation (IITP).           |                     |

## ACADEMIC SERVICE

**Conference Reviewer.**   NeurIPS | ICML (Top Reviewer) | AAAI | CVPR | ECCV | MICCAI | CIKM | EMNLP

## TEACHING

**Teaching Assistant**, Sungkyunkwan University:   Machine Learning (AAI3006, Spring 2024) | Data Mining (AAI3004, Fall 2023) | Deep Learning (ADS5019, Spring 2023) | Computer Structure and Systems (AAI2005, Fall 2022)

**Mentor**, 4th National University Student AI × BOOKATHON Competition, Winter 2023

## PATENTS

11 patents in medical and veterinary AI — 3 granted (KOR), 6 pending (KOR), 2 pending (US). Representative:

- **Diffusion-Based User-Guided Data Augmentation for Coronary Stenosis Detection.** Patent application, KOR.
- **Method for Image Analysis of Luxating Patella.** Granted patent, KOR.
- **Ophthalmic Disease Diagnosis Apparatus and Method for Animals Using AI Models.** Patent application, US.

## TECHNICAL SKILLS

|                       |                                                                        |      |
|-----------------------|------------------------------------------------------------------------|------|
| <b>Languages</b>      | Python (proficient), C/C++ , SQL, JavaScript, MATLAB, LaTeX            | Last |
| <b>Frameworks</b>     | PyTorch, HuggingFace, TensorFlow, ONNX, TorchScript, JIT               |      |
| <b>Medical Data</b>   | DICOM (2D/3D), NIfTI, PACS-adjacent pipelines, clinical report parsing |      |
| <b>Infrastructure</b> | Linux, Docker, Git, multi-GPU training and deployment (L4/T4)          |      |

updated: August 2026