JaeSeong Hong

PhD Candidate in Biomedical Informatics — *Robust multimodal AI for real-world clinical data*

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RESEARCH PROFILE

I develop robust multimodal AI that learns from clinical data that are incomplete, asynchronous, noisy, or institutionally heterogeneous. By integrating and validating signals across diverse real-world modalities, I aim to build models that provide reliable support for clinical decision-making.

Research focus Robust healthcare AI · Multimodal learning · Federated learning · Clinical data integration

EDUCATION

PhD in Biomedical Science Sep 2022 – Feb 2027 (expected)

Yonsei University College of Medicine, Seoul, Republic of Korea · Field: Biomedical Informatics

Dissertation Robust Multimodal Federated Learning under Missing Modality and Label Noise in Healthcare Data

Advisor Yu Rang Park, PhD

BBA in Big Data Management and Statistics Mar 2018 – Feb 2022

Kookmin University, Seoul, Republic of Korea

RESEARCH HIGHLIGHTS

Geometry-guided composition of incomplete multimodal clinical data Information Fusion, 2026

Developed ETF-UML, which aligns independently trained unimodal encoders on a fixed geometric substrate and composes any available subset of modalities through metadata-conditioned fusion. First author.

Retinal biomarkers for ADHD screening and visual-attention stratification npj Digital Medicine, 2025

Led the end-to-end AI modeling and analysis linking retinal features to clinically meaningful neurodevelopmental phenotypes. Co-first author.

Noninvasive Moyamoya disease screening from retinal photographs Stroke, 2024

Led the AI methodology, implementation, and external validation, establishing retinal photographs as an accessible disease biomarker. Co-first author.

Reliable federated learning under noisy and heterogeneous supervision Dissertation, in progress

REMIX detects unreliable modality-level supervision and routes reliable and unreliable samples through different learning strategies; FedSTAR aligns class representations across sites to guide the aggregation of heterogeneous client updates.

PUBLICATIONS AND PATENTS

9 peer-reviewed articles · 4 as first or co-first author · titles link to the DOI record

1. **JaeSeong Hong**, Mingyu Kim, Yu Rang Park. Geometry-guided unimodal-to-multimodal composition for incomplete and asynchronous clinical information fusion. *Information Fusion* 2026;138:104725. [IF 17.4]
2. Bong Kyung Jang, Shiwon Kim, Jae Yong Yu, **JaeSeong Hong**, Hee Woo Cho, Hong Seon Lee, Jiwoo Park, Jeesoo Woo, Young Han Lee, Yu Rang Park. Classification models for arthropathy grades of multiple joints based on hierarchical continual learning. *La Radiologia Medica* 2025;130(6):782–794.
3. Hangnyoung Choi*, **JaeSeong Hong***, Hyun Goo Kang*, Min-Hyeon Park, Sungji Ha, Junghan Lee, Sangchul Yoon, Daeseong Kim, Yu Rang Park, Keun-Ah Cheon. Retinal fundus imaging as biomarker for ADHD using machine learning for screening and visual attention stratification. *npj Digital Medicine* 2025;8(1):164. [IF 18.0]

4. Tae Hyun Kim, Jae Yong Yu, Won Seok Jang, Sun Cheol Heo, MinDong Sung, **JaeSeong Hong**, KyungSoo Chung, Yu Rang Park. PPFL: A personalized progressive federated learning method for leveraging different healthcare institution-specific features. *iScience* 2024;27(10):110943.
5. **JaeSeong Hong***, Sangchul Yoon*, Kyu Won Shim, Yu Rang Park. Screening of Moyamoya disease from retinal photographs: Development and validation of deep learning algorithms. *Stroke* 2024;55(3):715–724. [IF 11.1]
6. Sulim Chun, Sooyoung Jang, Jin Yong Kim, Chanyoung Ko, JooHyun Lee, **JaeSeong Hong**, Yu Rang Park. Comprehensive assessment and early prediction of gross motor performance in toddlers with graph convolutional networks-based deep learning. *JMIR Formative Research* 2024;8.
7. Jae Han Kim*, **JaeSeong Hong***, Hangnyoung Choi*, Hyun Goo Kang, Sangchul Yoon, Jung Yeon Hwang, Yu Rang Park, Keun-Ah Cheon. Development of deep ensembles to screen for autism and symptom severity using retinal photographs. *JAMA Network Open* 2023;6(12). [IF 11.7]
8. MinDong Sung, Jong Hyun Kim, Hyun-Seok Min, Sooyoung Jang, **JaeSeong Hong**, Bo Kyu Choi, JuHye Shin, Kyung Soo Chung, Yu Rang Park. Three-dimensional label-free morphology of CD8+ T cells as a sepsis biomarker. *Light: Science & Applications* 2023;12(1):265. [IF 23.4]
9. Chanyoung Ko, Jae-Hyun Lim, **JaeSeong Hong**, Soon-Beom Hong, Yu Rang Park. Development and validation of a joint attention-based deep learning system for detection and symptom severity assessment of autism spectrum disorder. *JAMA Network Open* 2023;6(5). [IF 11.7]

** Equal contribution.*

Patent Server, method, and computer program for predicting the incidence of Moyamoya disease through learning of fundus images. Yu Rang Park, **JaeSeong Hong**, Kyu Won Shim, Sangchul Yoon. *Yonsei University Industry-Academic Cooperation Foundation.* KR 10-2023-0040570 · US 18/399,951 · EP 24150080.0. Pending.

RESEARCH EXPERIENCE

Doctoral Researcher Apr 2022 – Present

Digital Healthcare Lab, Department of Biomedical Systems Informatics, Yonsei University College of Medicine

- Develop robust multimodal learning methods for incomplete and asynchronous clinical data, label noise, and cross-institutional heterogeneity.
- Collaborate with clinicians across critical care, ophthalmology, psychiatry, neurosurgery, and oncology to translate clinical questions into reproducible AI studies.

SELECTED FUNDED RESEARCH PROJECTS

Children Mind Voyager — Early Screening of Autism Spectrum Disorder 2025 – Present

Primary AI Developer · *Hyundai Insurance*

- Develop and validate multimodal models for ASD screening and severity stratification using prospective fundus images and child behavior videos.

K-MELLODDY — Federated Learning for Drug Discovery 2024 – Present

AI Methodology Lead, Yonsei University Team · *Ministry of Science and ICT & Ministry of Health and Welfare*

- Lead the Yonsei team's evaluation and development of robust aggregation strategies for federated drug-discovery models across pharmaceutical partners.

Distributed Network-Based Federated Learning Support System for Healthcare Data 2023 – 2024

Primary AI Developer · *Ministry of Trade, Industry and Energy*

- Developed multisite federated learning and colorectal-cancer prognosis models across five institutions, together with the clinical decision support system, resulting in a publication and a patent filing.

Adolescent and Children Retina Data — AI Training Data Construction Project 2022

Primary AI Developer · *Ministry of Science and ICT*

- Led data quality control and AI model development for ASD and ADHD screening, resulting in JAMA Network Open and npj Digital Medicine publications.

HONORS AND AWARDS

Academic Award for Outstanding Achievement 2025
Yonsei University · ADHD study published in npj Digital Medicine

Merit Academic Paper Award 2024
Yonsei University · Co-first-author study published in JAMA Network Open

Excellence Award, 2nd Place 2024
Acute Kidney Injury Datathon, Seoul National University Bundang Hospital

Excellence Award, 3rd Place 2022
Yonsei University × Rayence Medical Image Processing Challenge

ACADEMIC SERVICE

Journal Reviewer IEEE Transactions on Medical Imaging; BMC Pediatrics · 2026

Conference Reviewer MICCAI; AAAI · 2026

SELECTED TEACHING EXPERIENCE

Lead Instructor — Intermediate AI Course · *SK Siltron* Sep – Nov 2021
Six-week employee course on Python data analysis and applied machine learning.

Lead Instructor — 2021 Vision School · *Seoul Digitech High School* Oct 2021
Two-day data science and machine-learning workshop for students.

Tutor — Introductory Python Course · *LG Academy* Jun – Jul 2021
Technical Q&A and assignment evaluation for a four-week employee course.

TECHNICAL EXPERTISE

Research Methods Robust multimodal learning, federated learning, representation learning, missing-modality learning, label-noise learning

Clinical Data EHR, medical imaging, behavioral video, digital pathology, multi-omics

Development Cohort construction, multimodal fusion, multisite and external validation, missingness and noise stress testing, model interpretation

Programming Python, PyTorch, scikit-learn, Linux, GPU computing