SEUNGHUN BAEK

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RESEARCH INTERESTS

My research focuses on **robust representation learning** under practical data constraints, including **limited samples**, **class imbalance**, and **incomplete multimodal observations**. I aim to translate these methods into reliable real-world application, particularly in medical settings involving neurodegenerative diseases.

EDUCATION

POSTECH   Pohang, South Korea
Integrated M.S. and Ph.D. in Artificial Intelligence   Aug 2021 - Feb 2027 (Expected)

- Supervised by Prof. Won Hwa Kim at Medical Information Processing Lab.

Carnegie Mellon University   Pittsburgh, United States
Visiting Student in Language Technology Institute   Jan 2022 - Jul 2022

Korea National University of Arts   Seoul, South Korea
Exchange Student   Jun 2019 - Aug 2019

POSTECH   Pohang, South Korea
B.S. in Computer Science and Engineering   March 2017 - Aug 2021

PUBLICATIONS (*: EQUAL CONTRIBUTION)

[1] *Residual-Guided Expert Specialization for Incomplete Multimodal Learning*
Seunghun Baek, Jihwan Park, Jaeyoon Sim, Minjae Jeong, Hoseok Lee, Won Hwa Kim
Under Review

[2] *Set-Inclusive Uncertainty Modeling for Robust Brain Tumor Segmentation*
Seunghun Baek*, Jihwan Park*, Jaeyoon Sim, Hoseok Lee, Seungjoo Lee, Won Hwa Kim
Under Review

[3] *ENC-ODE: Event-level Neurodegenerative Modeling in Continuous Time with Neural ODEs*
Yujee Song*, **Seunghun Baek***, Guorong Wu, Won Hwa Kim
Under Review

[4] *Spectral-Temporal State Space Modeling on Functional Brain Networks*
Jaeyoon Sim*, Hoseok Lee*, Jihwan Park, **Seunghun Baek**, Won Hwa Kim
Under Review

[5] *Mark4D: Temporally-Consistent Watermarking for 4D Gaussian Splatting*
Jaejin Lee*, Minjae Jeong*, Joonhyuk Park, Yechan Hwang, **Seunghun Baek**, Won Hwa Kim
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2025

[6] *MNM: Multi-level Neuroimaging Meta-analysis with Hyperbolic Brain-Text Representations*
Seunghun Baek, Jaejin Lee, Jaeyoon Sim, Minjae Jeong, Won Hwa Kim
Medical Image Computing and Computer Assisted Intervention (MICCAI), 2025
Provisional Accept (Top ~9%)

[7] *OCL: Ordinal Contrastive Learning for Imputating Features with Progressive Labels*
Seunghun Baek*, Jaeyoon Sim*, Guorong Wu, Won Hwa Kim
Medical Image Computing and Computer Assisted Intervention (MICCAI), 2024
Provisional Accept (Top ~11%)

[8] *Modality-Agnostic Style Transfer for Holistic Feature Imputation*
Seunghun Baek*, Jaeyoon Sim*, Mustafa Dere, Minjeong Kim, Guorong Wu, Won Hwa Kim
IEEE International Symposium on Biomedical Imaging (ISBI), 2024
Oral presentation (Top ~14%)

[9] *Learning Covariance-Based Multi-Scale Representation of Neuroimaging Measures for Alzheimer Classification*
Seunghun Baek, Injun Choi, Mustafa Dere, Minjeong Kim, Guorong Wu, Won Hwa Kim
IEEE International Symposium on Biomedical Imaging (ISBI), 2023

PROJECT

AI-Driven BGA Solder Joint Failure Detection of PCB Assembly   Mar 2023 - Oct 2023
Granted by SK Hynix

· Related Topic: Long-tailed Recognition. Post-localization Refinement.
· Developed a soldering defect inspection system that reduces inspection time and operator-dependent variability.
· Selected as the **2nd Best Patent** among 27 industry-academia collaborative patents at SK Hynix. Press Release

PATENTS

[1] *Ordinal Contrastive Learning for Imputating Features with Progressive Labels*
Seunghun Baek, Jaeyoon Sim, Won Hwa Kim
US Patent App. 19/336,903, 2025

[2] *Future Event Prediction Method using Decoupled Marked Temporal Point Process and Analysis Apparatus*
Yujee Song, Donghyun Lee, **Seunghun Baek**, Won Hwa Kim
US Patent App. 19/388,012, 2025

[3] *Neuroimaging Meta-Analysis Method based on Hyperbolic Brain-Text Representations*
Seunghun Baek, Jaejin Lee, Jaeyoon Sim, Won Hwa Kim
KR Patent App. 10-2025-0134582

[4] *Future Event Prediction Method using Decoupled Marked Temporal Point Process and Analysis Apparatus*
Yujee Song, Donghyun Lee, **Seunghun Baek**, Won Hwa Kim
KR Patent App. 10-2025-0108586

[5] *Ordinal Contrastive Learning for Imputating Features with Progressive Labels*
Seunghun Baek, Jaeyoon Sim, Won Hwa Kim
KR Patent App. 10-2024-0128729

[6] *Solder Paste Inspection Device using Neural Network and Operation Method Thereof*
Seunghun Baek, Jaeyoon Sim, Won Hwa Kim
KR Patent App. 10-2024-0054209

HONORS & AWARDS

Best Paper Award (Bronze Prize)   Feb 2026
38th Workshop on Image Processing and Image Understanding (IPIU)

Global Core Talent Development Program (AI Intensive Program at CMU)   2022
Institute of Information & communications Technology Planning & Evaluation (IITP)

National Science & Technology Scholarship   2019
Korea Student Aid Foundation

Jigok Scholarship (Full-tuition scholarship)   2017-2020
POSTECH

PROFESSIONAL SERVICE

Reviewer, Medical Image Computing and Computer Assisted Intervention (MICCAI): 2026

TEACHING EXPERIENCES

(Teaching Assistant) AI & Big Data Academy at POSCO	Fall 2024
(Teaching Assistant) CSED211: Introduction to Computer Software Systems	Fall 2023
(Teaching Assistant) CSED490F: Signal Processing	Fall 2022

EXTRA ACTIVITIES

Residential Advisor	2019-2020
Student Mentoring Program - (CSED101: Programming & Problem solving)	2019-2020
Research Intern (Korea Institute of Science and Technology)	Jun 2019 - Jul 2020
Student Mentor at 9th Einstein Class (Hosted by Korea Hydro & Nuclear Power Co.)	Dec 2017 - Feb 2018
Software Education Student Volunteer Corps (Hosted by NAVER Connect Foundation)	Aug 2017 - Dec 2017