Yong-Min Shin

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Research Interest

I am interested in searching for simple and effective solutions to interesting questions, and contributing/learning via collaborative projects. During my PhD, my focus was efficient, explainable machine learning on graphs.

Experience

Research Scientist, LG AI Research 2025.06–Present
Building an AI-powered autonomous lab system.

Graduate Researcher, Yonsei University 2019.01 - 2025.08
Collaborated & contributed to multiple research projects, mostly focused on **machine learning on graph data**.

Efficient graph learning

(P4) Combining GNN-to-MLP knowledge distillation with PageRank-type propagation.

(P2) Graph filtering based recommendation without eigendecomposition.

Explainable graph learning

(P1) Is attention explanation in graph neural networks?

(P3) Feasibility study on utilizing explanations for graph pruning task

(P5, P6) Dataset-centric approach for model-level explanations for GNNs

Unsupervised representation learning on graphs

(P7) Inductive representation learning for edgeless nodes.

Visiting Researcher, University of New South Wales
(Advisor: Prof. Xin Cao) 2024.01–02
(P1) Collaborative research on using attention weights as interpretations for GNNs with self-attention.

Visiting Researcher, California State University, Long Beach (Remote)
(Advisor: Prof. Ju Cheol Moon) 2020–2021
(P8) Collaborative research on explainable gait recognition.

Undergraduate Research Intern, Yonsei University
(Advisor: Prof. Jin Keun Seo) 2017.12–2018.03
Collaborative machine learning project "Nuclei masking using U-net with data augmentations" (presenter in CSE poster exhibition)

Undergraduate Intern, Yonsei University
(HEP-COSMO group, Prof. Seong Chan Park) 2017.06–08
Scientific computing with Python

Education

M.S. & Ph.D. Integrated Program (Advisor: Prof. Won-Yong Shin) 2019.03 - 2025.08
School of Mathematics and Computing (Computational Science and Engineering)
Yonsei University, Seoul, South Korea.

Undergraduate Program 2015 - 2018
Department of Physics
Yonsei University, Seoul, South Korea.

Publications

P1. **Faithful and Accurate Self-Attention Attribution for Message Passing Neural Networks via the Computation Tree Viewpoint**
AAAI 2025
Yong-Min Shin, Siqing Li, Xin Cao, and Won-Yong Shin

P2. **Turbo-CF: Matrix Decomposition-Free Graph Filtering for Fast Recommendation**
SIGIR 2024 (Short Track)
Jin-Duk Park, **Yong-Min Shin** and Won-Yong Shin

P3. **On the Feasibility of Fidelity$^-$ for Graph Pruning**
IJCAI 2024 Workshop on Explainable Artificial Intelligence
Yong-Min Shin and Won-Yong Shin

P4. **Propagate & Distill: Towards Effective Graph Learners Using Propagation-Embracing MLPs**
LoG 2023
Yong-Min Shin and Won-Yong Shin
Extended version: "Unveiling the unseen potential of graph learning through MLPs: Effective graph learners using propagation-embracing MLPs", Knowl. Based Syst. 301: 112297 (2024)

P5. **PAGE: Prototype-Based Model-Level Explanations for Graph Neural Networks**
IEEE Transactions on Pattern Analysis and Machine Intelligence (2024) (**IF: 20.4**)
Yong-Min Shin, Sun-Woo Kim, and Won-Yong Shin

P6. **Prototype-Based Explanations for Graph Neural Networks (student abstract)**
AAAI 2022 **(Oral presentation)**
Yong-Min Shin, Sun-Woo Kim, Eun-Bi Yoon, and Won-Yong Shin

P7. **Edgeless-GNN: Unsupervised Inductive Edgeless Network Embedding**
IEEE Transactions on Emerging Topics in Computing (2024)
Yong-Min Shin, Cong-Tran, Won-Yong Shin, and Xin Cao

P8. **Explainable gait recognition with prototyping encoder–decoder**
PloS One (2022)
Jucheol Moon, **Yong-Min Shin**, Jin-Duk Park, Nelson Hebert Minaya, Won-Yong Shin, and Sang-Il Choi

P9. **DeformMLP: Effective Deformation Prediction for Breast Cancer Using Graph Topology-Assisted MLPs**
Digital Twin for Healthcare (DT4H) workshop, MICCAI 2025
Yong-Min Shin, Kyunghyun Lee, Sunghwan Lim, Kyungho Yoon, and Won-Yong Shin

P10. **Unsupervised Time-Series Anomaly Detection with Implicit Neural Representation**
arXiv (2022)
Kyeong-Joong Jeong and **Yong-Min Shin**.

Honors and Awards

Best Academic Paper Award 2025
Graduate School of Yonsei University

IIF Academic Research Fellowship 2024

Outstanding Poster Award 2024
School of Mathematics and Computing, Yonsei University

BK21 12% Matching Program Fellowship 2024

Best Presentation Award 2023
AI-Based Future of IoT Technologies and Services Workshop

Outstanding Applied AI Paper 2022
Yonsei AI Workshop

Samsung HumanTech Awards (Bronze Medal) 2021
Samsung Electronics (Computer Science & Engineering Division)

Outstanding Paper Award 2021
Korean Institute of Communications and Information Sciences (KICS)

Outstanding Poster Award 2021
Dept. of Computational Science and Engineering, Yonsei University

IIF Academic Research Fellowship 2021

Young Data Journalist of the Year 2020
Data Journalism Korea Conference

Projects

Basic Research Laboratory (BRL) Program MEGA Labs project 2023 - Present
Collaboration with Prof. Kyungho Yoon (Yonsei University),
Prof. Ha Young Kim (Yonsei University), and Prof. Gunwoo Noh (Korea University)

Global Core Talent Cultivation Support Program (IITP) 2020.08 - 2021.07
Collaboration with Prof. Jucheol Moon (California State University Long Beach)

Development of cuffless blood pressure estimation model 2021.06 - 2021.11
Multi-channel PPG analysis with Skylabs

Patents

Method and apparatus for interpreting graph transformers at edge level, KR Patent, Aug. 2025, #10-2025-0119306.

Apparatus and method for graph pruning based on graph neural network explanation, KR Patent, Sept. 2024, #10-2024-0119366.

Edgeless network embedding apparatus and method based on graph artificial neural network, KR Patent (Granted), Oct. 2023, #10-2588389.

Graph neural network explanation device and method based on prototype similarities, KR Patent, Jun. 2022, #10-2022-0072258.

Apparatus and method for learning graphs based on knowledge distillation technique, KR Patent, March 2024, #10-2024-0030852.

Apparatus and method for graph pruning based on graph neural network explanation, KR Patent, Sept. 2024, #10-2024-0119366.

Fast recommendation apparatus and method based on polynomial graph filtering, KR Patent, Aug. 2024, #10-2024-0115371.

Academic Activities

Conference reviewer NeurIPS, AAAI, KDD, WWW, IJCAI, WSDM, LoG

Journal reviewer TNNLS, NN

Seminars and lectures
7-week seminar series at GIST on the topic of graph learning *Mar.–Jun. 2025*
Lecture at Ewha Womans University ("A Practical Introduction to (Explainable) Graph Learning") *Apr. 2025*

Selected presentations
IJCAI 2024 Workshop on Explainable AI *Aug. 2024*
AI-Based Future of IoT Technologies and Services workshop *Feb. 2023*
Lifelog multi-modal healthcare workshop *May 2022*
Yonsei-ShanghaiTech University Workshop *Sep. 2019*

Other activities

Korean Translation Blog on Mechanistic interpretability
`https://lesskorrect.gitbook.io/mechanistic-interpretability`

Graph Learning Blog
`https://jordan7186.github.io/blog/`

Weekly Study group
`https://hallowed-vault-6f9.notion.site/GNN_YYK-0303f11d4fa0433792562333dea173a3?pvs=74`

POB graphers (Data journalism team)
`http://pob.kr/`
`https://shorturl.at/LSczo` (Data collection, processing, analysis and visualization)

Lab manager
`https://shorturl.at/NcTqT` (SSH/Docker tutorial for lab members)

Technical Skills

- *Python* (Pytorch, Pytorch Geometric, Deep Graph Library, Numpy, Scikit-learn etc.), Docker, Git.
- Language
  - Korean: Native proficiency
  - English: Native proficiency. TEPS (score 519, top 3. 58%), waived for the undergraduate English course at Yonsei University.