



# Yoonhyuk Choi (Last update: Jun. 2025)

Samsung SDS  
Preceding AI Lab  
Research Scientist

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## RESEARCH INTEREST

My research interest lies in *Machine Learning* and *Data Mining*, especially in **Large Language Models**, **Retrieval Augmented Generation**, **Recommender Systems**, and **Graph Neural Networks**.

## EDUCATION

### •Seoul National University

*Ph.D. & M.S.*, Computer Engineering

Mar. 2019 - Aug. 2023

Advisor: [Chong-Kwon Kim](#)

### •University of Seoul

*B.S.*, Computer Science

Mar. 2013 - Feb. 2019

Advisor: [Eui-Kyeong Hong](#)

## WORK EXPERIENCE

### •Research scientist

Samsung SDS, Seoul, South Korea  
RAG on knowledge graph, low-rank optimization

Oct. 2024 - Current

### •Postdoc. associate

Arizona State University, Tempe, United States (PI: [Selcuk Candan](#) and [Huan Liu](#))  
Participating in solving water-related problems (e.g., water quality, storage, and so on)

Nov. 2023 - Sep. 2024

### •Postdoc. associate

Korea Institute of Energy Technology, Naju, South Korea (PI: [Chong-Kwon Kim](#))  
Applying machine learning to solve energy-related problems

Sep. 2023 - Nov. 2023

### •Backend engineer

nTOPAZ, Seoul, South Korea  
Front & Back-end development for blockchain service, Tech: 1) Django & jQuery, 2) Node js, 3) JS & CSS

Jun. 2018 - Sep. 2018

## PUBLICATIONS ([GOOGLE SCHOLAR](#)) - C: CONFERENCE, J: JOURNAL

- (J14) Beyond Binary: Improving Signed Message Passing in Graph Neural Networks for Multi-Class Graphs  
[Yoonhyuk Choi](#), Taewook Ko, Jiho Choi, Chong-Kwon Kim  
**IEEE TPAMI, 2025 (minor revision) / IF: 20.8**
- (C13) Selective Blocking Framework for Message-Passing Neural Networks on Heterophilic and Uncertain Graphs  
[Yoonhyuk Choi](#), Taewook Ko, Jiho Choi, Chong-Kwon Kim  
**UAI, 2025**
- (C12) Review-Based Hyperbolic Cross-Domain Recommendation  
[Yoonhyuk Choi](#), Jiho Choi, Taewook Ko, Chong-Kwon Kim  
**WSDM, 2025**
- (C11) Mitigating Overfitting in Graph Neural Networks via Feature and Hyperplane Perturbation  
[Yoonhyuk Choi](#), Jiho Choi, Taewook Ko, Chong-Kwon Kim  
**WSDM, 2025**

- (J10) Beyond Message-Passing: Generalization of Graph Neural Networks via Feature Perturbation for ...  
Yoonhyuk Choi, Jiho Choi, Taewook Ko, Chong-Kwon Kim  
**IEEE TNNLS, 2024 / IF: 14.25**
- (C9) Improving the Text Convolution Mechanism with Large Language Model for Review-Based Recommendation  
Yoonhyuk Choi, Fahim Tasneema Azad  
**IEEE Big Data, 2024 (short)**
- (C8) Prioritizing Potential Wetland Areas via Region-to-Region Knowledge Transfer and Adaptive Propagation  
Yoonhyuk Choi, Reepal Shah, John Sabo, Selcuk Candan, Huan Liu  
**IEEE Big Data, 2024**
- (C7) Introducing CausalBench: A Flexible Benchmark Framework for Causal Analysis and Machine Learning  
Ahmet Kapkic, Pratanu Mandal, Shu Wan, Paras Sheth, Abhinav Gorantla, Yoonhyuk Choi, Huan Liu, K Selcuk Candan  
**CIKM, 2024 (benchmark)**
- (C6) Universal Graph Contrastive Learning with a Novel Laplacian Perturbation  
Taewook Ko, Yoonhyuk Choi, Chong-Kwon Kim  
**UAI, 2023**
- (J5) A spectral graph convolution for signed directed graphs via magnetic laplacian  
Taewook Ko, Yoonhyuk Choi, Chong-Kwon Kim  
**Neural Networks, 2023 (IF: 7.8)**
- (J4) Aspect-oriented unsupervised social link inference on user trajectory data  
Hyungho Byun, Yoonhyuk Choi, Chong-Kwon Kim  
**Information Sciences, 2023 (IF: 8.2)**
- (C3) Review-Based Domain Disentanglement without Duplicate Users or Contexts for Cross-Domain ...  
Yoonhyuk Choi, Jiho Choi, Taewook Ko, Hyungho Byun, Chong-Kwon Kim  
**CIKM, 2022**
- (C2) Finding Heterophilic Neighbors via Confidence-based Subgraph Matching for Semi-supervised Node ...  
Yoonhyuk Choi, Jiho Choi, Taewook Ko, Hyungho Byun, Chong-Kwon Kim  
**CIKM, 2022**
- (J1) Dynamic graph convolutional networks with attention mechanism for rumor detection on social media  
Jiho Choi, Taewook Ko, Yoonhyuk Choi, Hyungho Byun, Chong-Kwon Kim  
**PLOS ONE, 2021 (IF: 2.9)**
- .....
- (arXiv) SpecSphere: Dual-Pass Spectral-Spatial Graph Neural Networks with Certified Robustness  
Yoonhyuk Choi, Chong-Kwon Kim  
**Under Review (NeurIPS), 2025**
- (arXiv) Hierarchical Uncertainty-Aware Graph Neural Networks  
Yoonhyuk Choi, Jiho Choi, Taewook Ko, Chong-Kwon Kim  
**Under Review (CIKM), 2025**

## PROJECTS

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- **Enhancing Large Language Model with RAG** 2025  
*Research project, Samsung SDS*
  - Knowledge graph construction and RAG for chunk retrieval
  - Tiny-LLM (e.g., Llama 3B) distillation with huge-LLM (e.g., Llama 70B)
- **Can Large Language Model Improve the Text Convolution for Review-Based Recommendation?** 2024  
*Research project, Emit Lab*
  - Integrated the large language model (e.g., Llama 2, GPT-4) with the text convolution algorithm

- Investigated whether applying summarization based on large language models first, instead of performing 2D convolution on the entire text, results in performance improvement
  - Used online shopping mall datasets like Amazon and Walmart
- Selection Criteria and Assigned Weightage for Identifying Potential Locations Wetland** 2024  
*Research project funded by NSF (in collaboration with Tulane University)*
- Suggested knowledge transfer between different regions and adaptive propagation between grids
  - Demonstrated the effectiveness of the framework through real-world scenario
  - Used Natural Land Cover Dataset (NLCD), Soil Survey Geographic Database (SSURGO) datasets
- Causal Discovery of Agricultural Mgmt and Reservoir Op. Induced Water Quality Change** 2023  
*Research project funded by NSF (in collaboration with University of Arkansas)*
- Developed causal discovery algorithm for water quality improvement and reservoir management
  - Considered spatial and temporal variations and validated the causal learning ability
  - Used Natural Land Cover Dataset (NLCD), Soil Survey Geographic Database (SSURGO) datasets
- Tracking footprints with graph neural networks for the reduction of virus spread** 2021 - 2022  
*Coursework project, R&D in AI industry*
- Suggested spatial-temporal analysis for the next POI prediction to reduce virus spread
  - Selected as social contributing project
  - Used datasets are Coronamap of South Korea, Gowalla for POI prediction
- Personalized recommendation based on the user's purchasing histories and social network** 2020  
*Industry project funded by Samsung Research*
- Introduced time series analysis of users' purchasing history for personalized advertising
  - Applied graph neural networks with binary recommendation techniques
  - Used customer datasets provided by Samsung Research
- Next POI prediction based on user movements collected through large-scale sensors** 2019  
*Research project funded by Samsung Electronics*
- Recommending the next place based on where students visited within Seoul National University
  - Developed energy-saving and effective multi-hop transmission technologies for sensor
  - Collected datasets by attaching special stickers to participants

## SKILLS

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- Languages:** Python, C, HTML/CSS
- Tools / Frameworks:** PyTorch, torch-geometric, Scikit-learn, Git, Django, AWS, LaTeX

## EXTRACURRICULAR ACTIVITIES

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- Reviewer** 2025  
 ICLR / IJCAI / ICML / KDD (Feb. track) / TheWebConf / WSDM / CIKM
- Reviewer** 2024  
 LoG / CIKM / MM / Soft Computing (journal)
- Invited Talk (N-EWN Partner Symposium)** 2024  
 Titled Identifying Potential Sites for Wetlands, St. Augustine in Florida
- Reviewer** 2023  
 Journal of IEEE Multimedia / Plos one
- Research Assistant (RA), Graduate** Mar. 2019 - Jun. 2021  
 Funded by Samsung Research

- Teaching Assistant (TA)** Mar. 2020 - Jun. 2020  
Topic: Social Network Analysis and Anomaly Detection (Advisor: Chong-Kwon Kim)
- Research Assistant (RA), Undergrad** Jun. 2017 - Sep. 2017  
Distributed Computing Lab (Supervisor: Jin-Suk Kim)

## AWARDS & GRANTS

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- Best Ph.D. Dissertation Award** 2023  
Seoul National University
- Overseas Short-term Training Scholarship** 2023  
Chonnam National University
- BK21 Colloquium Graduate Student Fellowship** 2023  
Seoul National University
- BK21 Star Student Researcher Fellowship** 2023  
Seoul National University
- SIGIR Travel Awards** 2022  
For ACM Student Authors with Accepted Long Paper
- BK21 Scholarship** 2020  
(Graduate) Seoul National University
- Merit-based Scholarship** 2018 - 2019  
(Undergrad) University of Seoul

## REFERENCES

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- Selcuk K. Candan:** candan@asu.edu
- ChongKwon Kim:** ckim@kentech.ac.kr
- TaeKyung Kwon:** tkkwon98@gmail.com