Sukwon Yun

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RESEARCH INTEREST	**AI for Science**

- Addressing the inductive bias of AI (GNNs, LLMs) in real-world scenarios, with their application in the field of Computational Biology, particularly scRNA-seq and Tumor biology
- *Keywords*: Long-Tail Problem, Missing Features, Heterophily, Dropout, Tissue Phenotyping

EDUCATION

University of North Carolina at Chapel Hill, Chapel Hill, NC, USA   Aug 2024 –
- Ph.D. in Computer Science
  - Research Interest: AI4Science, Efficient ML
  - Advisor: Prof. Tianlong Chen

Korea Advanced Institute of Technology (KAIST), Daejeon, South Korea   Aug 2021 – Aug 2023
- M.S. in Industrial & Systems Engineering
  - Research Interest: Graph Neural Networks, Recommender Systems
  - Advisor: Prof. Chanyoung Park

Hanyang University, Seoul, South Korea   Mar 2015 – Aug 2021
- B.S. in Industrial Engineering
  - *Summa Cum Laude*, Period includes two years of military service

PUBLICATIONS
(*: Equal contribution)

CONFERENCES

[C5] DEGNN: Dual Experts Graph Neural Network Handling Both Edge and Node Feature Noise
Tai Hasegawa, **Sukwon Yun**, Xin Liu, Yin Jun Phua, Tsuyoshi Murata
The Pacific-Asia Conference on Knowledge Discovery and Data Mining (**PAKDD 2024**)

[C4] MUSE: Music Recommender System with Shuffle Play Recommendation Enhancement
Yunhak Oh*, **Sukwon Yun***, Dongmin Hyun, Sein Kim, Chanyoung Park
ACM International Conference on Information and Knowledge Management (**CIKM 2023**)

[C3] S-Mixup: Structural Mixup for Graph Neural Networks
Junghurn Kim*, **Sukwon Yun***, Chanyoung Park
ACM International Conference on Information and Knowledge Management (**CIKM Short 2023**)

[C2] MELT: Mutual Enhancement of Long-Tailed User and Item for Sequential Recommendation
Kibum Kim, Dongmin Hyun, **Sukwon Yun**, Chanyoung Park
ACM SIGIR Conference on Research and Development in Information Retrieval (**SIGIR 2023**)

[C1] LTE4G: Long-Tail Experts for Graph Neural Networks
Sukwon Yun, Kibum Kim, Kanghoon Yoon, Chanyoung Park
ACM International Conference on Information and Knowledge Management (**CIKM 2022**)

WORKSHOPS

[W2] Noise Robust Graph Learning under Feature-Dependent Graph-Noise
Yeonjun In, Kanghoon Yoon, **Sukwon Yun**, Kibum Kim, Sungchul Kim, Chanyoung Park
WWW 2024 Workshop on Data-centric Artificial Intelligence (**WWW DCAI 2024 *Oral***)

[W1] Single-cell RNA-seq data imputation using Feature Propagation
Sukwon Yun*, Junseok Lee*, Chanyoung Park
ICML Workshop on Computational Biology (**ICML WCB 2023 *Best Paper Award***)

IN SUBMISSION
(*: Equal contribution)

CONFERENCES

[S3] Enhancing Single-Cell Multi-Modal Multi-Task Learning via Sparse MoE
Sukwon Yun*, Jie Peng*, Namkyeong Lee, Yanyong Zhang, Chanyoung Park, Tianlong Chen
Under Review

[S2] Multiplexed Immunofluorescence Image Analysis through an Efficient Multiplex Network
Sukwon Yun, Jie Peng, Alexandro Trevino, Chanyoung Park, Tianlong Chen
Under Review

[S1] Toward Generalizability of Graph-based Imputation on Bio-Medical Missing Data
Sukwon Yun, Yunhak Oh, Junseok Lee, Xin Liu, Tsuyoshi Murata, Dongmin Hyun, Sein Kim, Tianlong Chen, Chanyoung Park
Under Review

JOURNAL

[S4] Single-cell RNA sequencing data imputation using bi-level feature propagation
Junseok Lee*, **Sukwon Yun***, Yeongmin Kim, Tianlong Chen, Manolis Kellis, Chanyoung Park
Under Review

RESEARCH EXPERIENCES	**Remote Research Internship**	Aug 2023 – Present

- Research Intern in UNITES Lab.
  - Mentor: Dr. Tianlong Chen (Postdoctoral Researcher at CSAIL@MIT and Incoming Assistant Professor at UNC)
  - Explored cellular heterogeneity in mIF image using multi-layer scalable GNNs, submitted to CVPR 2024
  - Explored the generalizability of graph-based imputation in the bio-medical domain, submitted to ICLR 2024
  - Aimed at feature propagation in scRNA-seq, collaborating with Prof. Manolis Kellis, submitted to Nature Methods

Tokyo Institute of Technology (Tokyo Tech), Tokyo, Japan   Oct 2022 – Feb 2023
- Visiting Researcher in Murata Lab.
  - Host: Prof. Tsuyoshi Murata
  - Explored weaknesses of structured-based and GNN-based methods in graphs with missing features
  - Proposed supervised contrastive learning that incorporates pseudo-labels in graph domains

Korea Advanced Institute of Technology (KAIST), Daejeon, South Korea   Dec 2020 – Feb 2021
- Research Intern in Data Science & Artificial Intelligence Lab. (DSAIL)
  - Mentor: Prof. Chanyoung Park
  - Explored the theoretical basis and practical implementation of GNNs such as GCN and GAT (link)

Hanyang University, Seoul, South Korea   Sep 2020 – Aug 2021
- Student Researcher in Intelligent Data Systems Lab. (IDSL)
  - Mentor: Prof. Kichun Lee
  - Proposed an advanced version of Neural Graph Collaborative Filtering using a heterogeneous graph
  - Implemented One-Class SVM on anomaly detection task using MNIST dataset

TEACHING EXPERIENCE	**IE343: Statistical Machine Learning**, KAIST	Spring, 2022

- Gave a tutorial and hosted Kaggle Competition (Course Project) as a Teaching Assistant
  - Competition: Predicting a person's income using a demographic dataset under an imbalance situation

AWARDS & SCHOLARSHIPS	**Best Paper Award**	2023

- ICML Workshop on Computational Biology, Honolulu, Hawai'i, USA

Korea National Scholarship   2021 – 2023
- Awarded by the Ministry of Science and ICT, South Korea

Poster Competition Excellence Award   2022
- Awarded at Industrial/Social Problem Solving Session held by Department of ISysE, KAIST

SIGIR Student Travel Award   2022
- ACM International Conference on Information and Knowledge Management, Georgia, USA

Merit Based Scholarship   2021
- Awarded by the Department of Industrial Engineering, Hanyang University

Hanyang Academic Achievement Award   2021
- Awarded within the top 3% among the College of Engineering, Hanyang University

Certificate of Recognition   2018
- Awarded when serving military service as an auxiliary police by Seoul Metropolitan Police

PROFESSIONAL SERVICES	**Event Organizations**	

- Session Chair, Knowledge Representation 3, CIKM 2023, Birmingham, UK

Conference Reviews
- The European Conference on Computer Vision (ECCV)   2024
- International Conference on Machine Learning (ICML)   2024
- The International Conference on Learning Representations (ICLR)   2024
- Conference on Parsimony and Learning (CPAL)   2024
- Conference on Neural Information Processing Systems (NeurIPS)   2023

Workshop Reviews

- ASEA Workshop @ AAAI   2024

PROJECTS   **Recommending Financial Products based on Graph Embeddings**   Feb 2021 – Feb 2022
- Collaboration with Hana Bank, South Korea
  - Generated financial networks via Jaccard similarity from user's data and enhanced user representation via GNN

REFERENCES
- **Dr. Tianlong Chen**, Incoming Assistant Professor, UNC
  Email: tianlong@mit.edu

- **Prof. Chanyoung Park**, Assistant Professor, KAIST
  Email: cy.park@kaist.ac.kr

- **Prof. Tsuyoshi Murata**, Professor, Tokyo Tech
  Email: murata@c.titech.ac.jp