# Sukwon Yun

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| **RESEARCH INTEREST** | **AI for Science, Multi-Agent LLMs** | |
| | ▪ Multimodal Learning and Multi-Agent LLM Collaboration for Scientific Discovery | |

**EDUCATION**

**University of North Carolina at Chapel Hill**, Chapel Hill, NC, USA
- ▪ Ph.D. Program in Computer Science (Advisor: Prof. Tianlong Chen) — Aug 2024 – Aug 2025
- ▪ M.S. in Computer Science (Advisor: Prof. Tianlong Chen) — Aug 2024 – Dec 2025

**Korea Advanced Institute of Technology (KAIST)**, Daejeon, South Korea — Aug 2021 – Aug 2023
- ▪ M.S. in Industrial & Systems Engineering (Advisor: Prof. Chanyoung Park)

**Hanyang University**, Seoul, South Korea — Mar 2015 – Aug 2021
- ▪ B.S. in Industrial Engineering, *Summa Cum Laude*

**RESEARCH EXPERIENCES**

**Genentech**, South San Francisco, CA, USA — May 2025 – Aug 2025
- ▪ Research Intern in Regev Lab.
  - • Mentors: Prof. Aviv Regev, Dr. Russell Littman

**University of North Carolina at Chapel Hill**, Chapel Hill, USA — Aug 2024 – May 2025
- ▪ Research Assistant in UNITES Lab.
  - • Advisor: Prof. Tianlong Chen

**Massachusetts Institute of Technology (MIT)**, Cambridge, MA — Aug 2023 – Jul 2024
- ▪ Remote Research Intern in Kellis Lab.
  - • Mentors: Prof. Tianlong Chen, Dr. Zunpeng Liu

**Tokyo Institute of Technology (Tokyo Tech)**, Tokyo, Japan — Oct 2022 – Feb 2023
- ▪ Visiting Researcher in Murata Lab.
  - • Host: Prof. Tsuyoshi Murata

**Korea Advanced Institute of Technology (KAIST)**, Daejeon, South Korea — Dec 2020 – Feb 2021
- ▪ Research Intern in Data Science & Artificial Intelligence Lab.
  - • Mentor: Prof. Chanyoung Park

**SELECTED PUBLICATIONS**
(FULL LIST IN THE END)
*: Equal contribution
#: Co-correspondence

Sparse Mixture-of-Experts for Multi-Channel Imaging: Are All Channel Interactions Required?
**Sukwon Yun**, *et al.*, Aviv Regev[#], Russell Littman[#]
Conference on Neural Information Processing Systems (**NeurIPS 2025 Workshop on AI for Science**)

Graph-of-Agents: A Graph-Based Framework for Multi-Agent LLM Collaboration
**Sukwon Yun**, *et al.*, Jie Chen, James Zou, Guohao Li, Tianlong Chen
International Conference on Machine Learning (**ICML 2025 Workshop on Multi-Agent Systems**)

Cut the Crap: An Economical Communication Pipeline for LLM-based Multi-Agent Systems
Guibin Zhang, Yanwei Yue, Zhixun Li, **Sukwon Yun**, *et al.*, Tianlong Chen
International Conference on Learning Representations (**ICLR 2025**)

Single-cell epigenomics and transcriptomics reveal regulatory rewiring in Alzheimer's disease across brain regions
Zunpeng Liu*, Shanshan Zhang*, ..., **Sukwon Yun**, *et al.*, Manolis Kellis
**Cell (2025)**

Flex-MoE: Modeling Arbitrary Modality Combination via the Flexible Mixture-of-Experts
**Sukwon Yun**, *et al.*, Qi Long[#], Tianlong Chen[#]
Conference on Neural Information Processing Systems (**NeurIPS 2024 Spotlight**)

Mew: Multiplexed Immunofluorescence Image Analysis through an Efficient Multiplex Network
**Sukwon Yun**, *et al.*, Tianlong Chen
European Conference on Computer Vision (**ECCV 2024**)

Single-cell RNA-seq data imputation using Feature Propagation
**Sukwon Yun***, Junseok Lee*, Chanyoung Park
International Conference on Machine Learning (**ICML 2023 Workshop on Comp. Bio. Best Paper Award**)

LTE4G: Long-Tail Experts for Graph Neural Networks
**Sukwon Yun**, *et al.*, Chanyoung Park
ACM International Conference on Information and Knowledge Management (**CIKM 2022**)

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| **AWARDS &** **SCHOLARSHIPS** | **NeurIPS Top Reviewer** | 2025 |

**AWARDS & SCHOLARSHIPS**

**NeurIPS Top Reviewer**                                                                        2025
- The Thirty-Ninth Annual Conference on Neural Information Processing Systems, San Diego, CA, USA

**Best Paper Award**                                                                            2025
- AAAI Workshop on Large Language Models and Generative AI for Health, Philadelphia, PA, USA

**Best Paper Award**                                                                            2024
- KDD Workshop on Federated Learning for Data Mining and Graph Analytics, Barcelona, Spain

**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

**TEACHING EXPERIENCE**

**University of North Carolina at Chapel Hill**
- COMP283: Discrete Structures                                                          Fall, 2025

**KAIST**
- IE343: Statistical Machine Learning                                                 Spring, 2022

**PROFESSIONAL SERVICES**

**Event Organizations**
- Session Chair, Knowledge Representation 3, Birmingham, UK, CIKM (2023)

**Program Committee**
- AAAI (2025, 2026)

**Conference Reviews**
- NeurIPS (2023 - ), ICLR (2024 - ), ICML (2024 - ), CVPR (2025), ICCV (2025), ECCV (2024), MICCAI (2025), ACL (2025), COLM (2025), KDD (2025), CPAL (2024 - )

**Workshop Reviews**
- GenAI4Health @ AAAI (2025), ML4LMS @ ICML (2024), ASEA @ AAAI (2024)

**FULL PUBLICATIONS**
*: Equal contribution
#: Co-correspondence

**CONFERENCES**

[C20] BetaConform: Efficient MAP Estimation of LLM Ensemble Judgment Performance with Prior Transfer
Huaizhi Qu, Inyoung Choi, Zhen Tan, Song Wang, **Sukwon Yun**, Qi Long, Faizan Siddiqui, Kwonjoon Lee, Tianlong Chen
Conference on Neural Information Processing Systems (**NeurIPS 2025**)

[C19] Training Robust Graph Neural Networks by Modeling Noise Dependencies
Yeonjun In, Kanghoon Yoon, **Sukwon Yun**, Kibum Kim, Sungchul Kim, Chanyoung Park
Conference on Neural Information Processing Systems (**NeurIPS 2025**)

[C18] Oldie but Goodie: Re-illuminating Label Propagation on Graphs with Partially Observed Features
**Sukwon Yun**, Xin Liu, Yunhak Oh, Junseok Lee, Tianlong Chen, Tsuyoshi Murata, Chanyoung Park
ACM SIGKDD Conference on Knowledge Discovery and Data Mining (**KDD 2025**)

[C17] Spatial Coordinates as a Cell Language: A Multi-Sentence Framework for Imaging Mass Cytometry Analysis
Chi-Jane Chen*, Yuhang Chen*, **Sukwon Yun\***, Natalie Stanley, Tianlong Chen
Annual Meeting of the Association for Computational Linguistics (**ACL 2025 Findings**)

[C16] GRNFormer: A Biologically-Guided Framework for Integrating Gene Regulatory Networks into RNA Foundation Models
Mufan Qiu, Xinyu Hu, Fengwei Zhan, **Sukwon Yun**, Jie Peng, Ruichen Zhang, Bhavya Kailkhura, Jiekun Yang, Tianlong Chen
Annual Meeting of the Association for Computational Linguistics (**ACL 2025 Findings**)

[C15] Agents Under Siege: Breaking Pragmatic Multi-Agent LLM Systems with Optimized Prompt Attacks
Rana Shahroz, Zhen Tan, **Sukwon Yun**, Charles Fleming, Tianlong Chen
Annual Meeting of the Association for Computational Linguistics (**ACL 2025**)

[C14] I$^2$MoE: Interpretable Multimodal Interaction-aware Mixture-of-Experts
Jiayi Xin, **Sukwon Yun**, Jie Peng, Inyoung Choi, Jenna L. Ballard, Tianlong Chen, Qi Long
International Conference on Machine Learning (**ICML 2025**)

[C13] Modalities Contribute Unequally: Enhancing Medical Multi-modal Learning through Adaptive Modality Token Re-balancing
Jie Peng, Jenna L. Ballard, Mohan Zhang, **Sukwon Yun**, Jiayi Xin, Qi Long, Yanyong Zhang, Tianlong Chen
International Conference on Machine Learning (**ICML 2025**)

[C12] Sparse MoE as a New Treatment: Addressing Forgetting, Fitting, Learning Issues in Multi-Modal Multi-Task Learning
Jie Peng, **Sukwon Yun**, Kaixiong Zhou, Ruida Zhou, Thomas Hartvigsen, Yanyong Zhang, Zhangyang Wang, Tianlong Chen
Conference on Parsimony and Learning (**CPAL 2025**)

[C11] Cut the Crap: An Economical Communication Pipeline for LLM-based Multi-Agent Systems
Guibin Zhang, Yanwei Yue, Zhixun Li, **Sukwon Yun**, Guancheng Wan, Kun Wang, Dawei Cheng, Jeffrey Xu Yu, Tianlong Chen
International Conference on Learning Representations (**ICLR 2025**)

[C10] PortLLM: Personalizing Evolving Large Language Models with Training-Free and Portable Model Patches
Rana Muhammad Shahroz Khan, Pingzhi Li*, **Sukwon Yun**\*, Zhenyu Wang, Shahriar Nirjon, Chau-Wai Wong, Tianlong Chen
International Conference on Learning Representations (**ICLR 2025**)

[C9] Subgraph Federated Learning for Local Generalization
Sungwon Kim, Yoonho Lee, Yunhak Oh, Namkyeong Lee, **Sukwon Yun**, Junseok Lee, Sein Kim, Carl Yang, Chanyoung Park
International Conference on Learning Representations (**ICLR 2025 <span style="color:red">Oral</span>**)

[C8] Flex-MoE: Modeling Arbitrary Modality Combination via the Flexible Mixture-of-Experts
**Sukwon Yun**, Inyoung Choi, Jie Peng, Yangfan Wu, Jingxuan Bao, Qiyiwen Zhang, Jiayi Xin, Qi Long[#], Tianlong Chen[#]
Conference on Neural Information Processing Systems (**NeurIPS 2024 <span style="color:red">Spotlight</span>**)

[C7] DALK: Dynamic Co-Augmentation of LLMs and KG to answer Alzheimer's Disease Questions with Scientific Literature
Dawei Li, Shu Yang, Zhen Tan, Jae Young Baik, **Sukwon Yun**, Joseph Lee, Aaron Chacko, Bojian Hou, Duy Duong-Tran, Ying Ding, Huan Liu, Li Shen, Tianlong Chen
Conference on Empirical Methods in Natural Language Processing (**EMNLP 2024 Findings**)

[C6] Mew: Multiplexed Immunofluorescence Image Analysis through an Efficient Multiplex Network
**Sukwon Yun**, Jie Peng, Alexandro Trevino, Chanyoung Park, Tianlong Chen
European Conference on Computer Vision (**ECCV 2024**)

[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
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 2023 Short**)

[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**)

### JOURNALS

[J2]  Single-cell epigenomics and transcriptomics reveal regulatory rewiring in Alzheimer's disease across brain regions
Zunpeng Liu*, Shanshan Zhang*, Benjamin T. James, Kyriaki Galani, Riley J. Mangan, Stuart Benjamin Fass, Chuqian Liang, Manoj M Wagle, Carles A. Boix, Yosuke Tanigawa, **Sukwon Yun**, Yena Sung, Xushen Xiong, Na Sun, Lei Hou, Martin Wohlwend, Mufan Qiu, Xikun Han, Lei Xiong, Efthalia Preka, Lei Huang, William F. Li, Li-Lun Ho, Amy Grayson, Julio Mantero, Alexey Kozlenkov, Hansruedi Mathys, Tianlong Chen, Stella Dracheva, David A. Bennett, Li-Huei Tsai, Manolis Kellis
**Cell 2025**

[J1]  Single-cell RNA sequencing data imputation using bi-level feature propagation
Junseok Lee*, **Sukwon Yun**\*, Yeongmin Kim, Tianlong Chen, Manolis Kellis, Chanyoung Park
**Briefings in Bioinformatics 2024**

### WORKSHOPS

[W6]  Sparse Mixture-of-Experts for Multi-Channel Imaging: Are All Channel Interactions Required?
**Sukwon Yun**, Heming Yao, Burkhard Hoeckendorf, David Richmond, Aviv Regev[#], Russell Littman[#]
**NeurIPS 2025 AI for Science**

[W5]  Graph-of-Agents: A Graph-Based Framework for Multi-Agent LLM Collaboration
**Sukwon Yun**, Jie Peng, Pingzhi Li, Wendong Fan, Jie Chen, James Zou, Guohao Li, Tianlong Chen
**ICML 2025 MAS**

[W4]  Generate, Then Retrieve: Addressing Missing Modalities in Multimodal Learning via Generative AI and MoE
**Sukwon Yun**\*, Jiayi Xin*, Inyoung Choi, Jie Peng, Qi Long, Tianlong Chen
**AAAI GenAI4Health 2025** <span style="color:red">**Best Paper Award**</span>

[W3]  Subgraph Federated Learning for Local Generalization
Sungwon Kim, Yoonho Lee, Yunhak Oh, Namkyeong Lee, **Sukwon Yun**, Junseok Lee, Sein Kim, Carl Yang, Chanyoung Park
**KDD 2024 FedKDD** <span style="color:red">**Best Paper Award**</span>

[W2]  Noise Robust Graph Learning under Feature-Dependent Graph-Noise
Yeonjun In, Kanghoon Yoon, **Sukwon Yun**, Kibum Kim, Sungchul Kim, Chanyoung Park
**WWW 2024 DCAI** <span style="color:red">**Oral**</span>

[W1]  Single-cell RNA-seq data imputation using Feature Propagation
**Sukwon Yun**\*, Junseok Lee*, Chanyoung Park
**ICML 2023 WCB** <span style="color:red">**Best Paper Award**</span>

### PREPRINT

[P2]  Symbolic Mixture-of-Experts: Adaptive Skill-based Routing for Heterogeneous Reasoning
Justin Chih-Yao Chen*, **Sukwon Yun**\*, Elias Stengel-Eskin*, Tianlong Chen, Mohit Bansal

[P1]  scMoE: single-cell Multi-Modal Multi-Task Learning via Sparse Mixture-of-Experts
**Sukwon Yun**\*, Jie Peng*, Namkyeong Lee, Yanyong Zhang, Chanyoung Park, Zunpeng Liu, Tianlong Chen