

# Sukwon Yun

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## RESEARCH INTEREST

### AI for Science, LLM-based Multi-Agent Systems

- Multimodal Learning and Multi-Agent LLM Collaboration for Scientific Discovery

## EDUCATION

### University of North Carolina at Chapel Hill, Chapel Hill, NC, USA

Aug 2024 – Present

- M.S. in Computer Science (Advisor: [Prof. Tianlong Chen](#))

### 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, NC, USA

Aug 2024 – May 2025

- Research Assistant in UNITES Lab.
  - Advisor: [Prof. Tianlong Chen](#)

### Massachusetts Institute of Technology (MIT), Cambridge, MA, USA

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<sup>#</sup>, Russell Littman<sup>#</sup>

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 multiregion epigenomic rewiring in Alzheimer's disease progression and cognitive resilience

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<sup>#</sup>, Tianlong Chen<sup>#</sup>

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**)

<b>AWARDS &amp; SCHOLARSHIPS</b>	<b>NeurIPS Top Reviewer</b>	2025
	▪ The Thirty-Ninth Annual Conference on Neural Information Processing Systems, San Diego, CA, USA	
	<b>Best Paper Award</b>	2025
	▪ AAAI Workshop on Large Language Models and Generative AI for Health, Philadelphia, PA, USA	
	<b>Best Paper Award</b>	2024
	▪ KDD Workshop on Federated Learning for Data Mining and Graph Analytics, Barcelona, Spain	
	<b>Best Paper Award</b>	2023
	▪ ICML Workshop on Computational Biology, Honolulu, Hawai'i, USA	
	<b>Korea National Scholarship</b>	2021 – 2023
	▪ Awarded by the Ministry of Science and ICT, South Korea	
<b>TEACHING EXPERIENCE</b>	<b>Poster Competition Excellence Award</b>	2022
	▪ Awarded at Industrial/Social Problem Solving Session held by Department of ISysE, KAIST	
	<b>SIGIR Student Travel Award</b>	2022
<b>PROFESSIONAL SERVICES</b>	▪ ACM International Conference on Information and Knowledge Management, Georgia, USA	
	<b>Merit Based Scholarship</b>	2021
	▪ Awarded by the Department of Industrial Engineering, Hanyang University	
	<b>Hanyang Academic Achievement Award</b>	2021
<b>FULL PUBLICATIONS</b> *: Equal contribution #: Co-correspondence	▪ Awarded within the top 3% among the College of Engineering, Hanyang University	
	<b>Certificate of Recognition</b>	2018
	▪ Awarded when serving military service as an auxiliary police by Seoul Metropolitan Police	
<b>CONFFERENCES</b>	<b>University of North Carolina at Chapel Hill</b>	
	▪ COMP283: Discrete Structures	Fall, 2025
<b>CONFERRANCES</b>	<b>KAIST</b>	
	▪ IE343: Statistical Machine Learning	Spring, 2022
<b>Event Organizations</b>	<b>Program Committee</b>	
	▪ Session Chair, Knowledge Representation 3, Birmingham, UK, CIKM (2023)	
	<b>Conference Reviews</b>	
	▪ NeurIPS (2023 - ), ICLR (2024 - ), ICML (2024 - ), CVPR (2025), ICCV (2025), ECCV (2024), MICCAI (2025), ACL (2025), COLM (2025), KDD (2025), CPAL (2024 - )	
	<b>Workshop Reviews</b>	
	▪ GenAI4Health @ AAAI (2025), ML4LMS @ ICML (2024), ASEA @ AAAI (2024)	
	<b>[C20] BetaConform: Efficient MAP Estimation of LLM Ensemble Judgment Performance with Prior Transfer</b>	
	Huaizhi Qu, Inyoung Choi, Zhen Tan, Song Wang, <b>Sukwon Yun</b> , Qi Long, Faizan Siddiqui, Kwonjoon Lee, Tianlong Chen	
	Conference on Neural Information Processing Systems ( <b>NeurIPS 2025</b> )	
	<b>[C19] Training Robust Graph Neural Networks by Modeling Noise Dependencies</b>	
<b>GRNFormer: A Biologically-Guided Framework for Integrating Gene Regulatory Networks into RNA Foundation Models</b>	Yeonjun In, Kanghoon Yoon, <b>Sukwon Yun</b> , Kibum Kim, Sungchul Kim, Chanyoung Park	
	Conference on Neural Information Processing Systems ( <b>NeurIPS 2025</b> )	
<b>[C18] Oldie but Goodie: Re-illuminating Label Propagation on Graphs with Partially Observed Features</b>		
	<b>Sukwon Yun</b> , Xin Liu, Yunhak Oh, Junseok Lee, Tianlong Chen, Tsuyoshi Murata, Chanyoung Park	
<b>ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD 2025)</b>		
	ACM SIGKDD Conference on Knowledge Discovery and Data Mining ( <b>KDD 2025</b> )	
<b>[C17] Spatial Coordinates as a Cell Language: A Multi-Sentence Framework for Imaging Mass Cytometry Analysis</b>		
	Chi-Jane Chen*, Yuhang Chen*, <b>Sukwon Yun*</b> , Natalie Stanley, Tianlong Chen	
<b>Annual Meeting of the Association for Computational Linguistics (ACL 2025 Findings)</b>		
	Annual Meeting of the Association for Computational Linguistics ( <b>ACL 2025 Findings</b> )	
<b>[C16] GRNFormer: A Biologically-Guided Framework for Integrating Gene Regulatory Networks into RNA Foundation Models</b>		
	Mufan Qiu, Xinyu Hu, Fengwei Zhan, <b>Sukwon Yun</b> , Jie Peng, Ruichen Zhang, Bhavya Kailkhura, Jiekun Yang, Tianlong Chen	
<b>Annual Meeting of the Association for Computational Linguistics (ACL 2025 Findings)</b>		
	Annual Meeting of the Association for Computational Linguistics ( <b>ACL 2025 Findings</b> )	

- [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<sup>2</sup>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 Oral**)
- [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 Spotlight**)
- [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, Alejandro 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 multiregion epigenomic rewiring in Alzheimer's disease progression and cognitive resilience  
 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

- [W7] 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**
- [W6] 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**
- [W5] One Leaf Knows Autumn: A Piece of Data-Model Facilitates Efficient Cancer Prognosis with Histological and Genomic Modalities  
 Jie Peng, Jingxia Jiang, Yueliang Ying, **Sukwon Yun**, Qi Long, Yanyong Zhang, Tianlong Chen  
**AAAI GenAI4Health 2025**
- [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 Best Paper Award**
- [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 Best Paper Award**
- [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 Oral**
- [W1] Single-cell RNA-seq data imputation using Feature Propagation  
**Sukwon Yun\***, Junseok Lee\*, Chanyoung Park  
**ICML 2023 WCB Best Paper Award**

#### 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