

Sungwon Kim

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RESEARCH INTEREST

AI Surrogate Modeling for CAE and PDE solvers, Developing **high-fidelity AI surrogate models** to replace computationally intensive **3D CAE simulations** and **PDE solvers**.

Keywords: Physics AI (Engineering), 3D Simulation, PINNs, Neural Operator

EDUCATION

KAIST (Korea Advanced Institute of Technology), Daejeon, South Korea

- Ph.D. in Graduate School of Data Science Feb 2024 – Present
 - Research Interest: Physics AI (Engineering), Neural Operator
 - Adviser: [Prof. Chanyoung Park](#)
- M.S. in Graduate School of Data Science Feb 2022 – Feb 2024
 - Research Interest: Data-efficient Learning, Federated Learning
 - Adviser: [Prof. Chanyoung Park](#)

Korea University, Seoul, South Korea

Mar 2014 – Feb 2022

- B.S. in Civil, Environmental and Architectural Engineering

PROFESSIONAL EXPERIENCE

AI SOFTWARE Of KOREA, Seoul, South Korea

- Co-CEO, Co-Founder Jul 2019 – Feb 2022
 - Development of AI for Socially Vulnerable Groups (information disadvantaged, older persons, children)
 - Management

PUBLICATIONS

(*: Equal contribution)

CONFERENCES

- [C10] **Disentangling Hyperedges through the lens of Category Theory**
Yoonho Lee, Junseok Lee, Sangwoo Seo, **Sungwon Kim**, Yeongmin Kim, Chanyoung Park
NeurIPS 2025 - The Thirty-Ninth Annual Conference on Neural Information Processing Systems
- [C9] **Thickness-aware E(3)-Equivariant 3D Mesh Neural Networks**
Sungwon Kim, Namkyeong Lee, Yunyoung Doh, Seungmin Shin, Guimok Cho, Seung-Won Jeon, Sangkook Kim, Chanyoung Park
ICML 2025 - Forty-Second International Conference on Machine Learning
- [C8] **Subgraph Federated Learning for Local Generalization**
Sungwon Kim, Yoonho Lee, Yunhak Oh, Namkyeong Lee, Sukwon Yun, Junseok Lee, Sein Kim, Carl Yang, Chanyoung Park
ICLR 2025 (Oral, top 1.8%) - The Thirteenth International Conference on Learning Representations
- [C7] **Self-Explainable Temporal Graph Networks based on Graph Information Bottleneck**
Sangwoo Seo, **Sungwon Kim**, Jihyeong Jung, Yoonho Lee, Chanyoung Park
KDD 2024 - ACM SIGKDD Conference on Knowledge Discovery and Data Mining
- [C6] **Unsupervised Episode Generation for Graph Meta-learning**
Jihyeong Jung, Sangwoo Seo, **Sungwon Kim**, Chanyoung Park
ICML 2024 – International Conference on Machine Learning
- [C5] **DSLRL: Diversity Enhancement and Structure Learning for Rehearsal-based Graph Continual Learning**
Seungyoon Choi*, Wonjoong Kim*, **Sungwon Kim**, Yeonjun In, Sein Kim, Chanyoung Park
WWW 2024 (Oral) – The Web Conference
- [C4] **Interpretable Prototype-based Graph Information Bottleneck**
Sangwoo Seo, **Sungwon Kim**, Chanyoung Park
NeurIPS 2023 - In Conference on Neural Information Processing Systems (NeurIPS)
- **Gold Prize at the 2023 Samsung Humantech Paper Award**
- [C3] **Density of States Prediction of Crystalline Materials via Prompt-guided Multi-Modal Transformer**
Namkyeong Lee*, Heewoong Noh*, **Sungwon Kim**, Dongmin Hyun, Gyoung S. Na, Chanyoung Park
NeurIPS 2023 - In Conference on Neural Information Processing Systems (NeurIPS)

- [C2] **Task-Equivariant Graph Few-shot Learning**
Sungwon Kim, Junseok Lee, Namkyeong Lee, Wonjoong Kim, Seungyeon Choi, Chanyoung Park
KDD 2023 - ACM SIGKDD Conference on Knowledge Discovery and Data Mining
- [C1] **Conditional Graph Information Bottleneck for Molecular Relational Learning**
 Namkyeong Lee, Dongmin Hyun, Gyoung S Na, **Sungwon Kim**, Junseok Lee, Chanyoung Park
ICML 2023 - International Conference on Machine Learning

JOURNALS

- [J1] **Deep Single-cell RNA-seq Data Clustering with Graph Prototypical Contrastive Learning**
 Junseok Lee, **Sungwon Kim**, Dongmin Hyun, Namkyeong Lee, Yejin Kim, Chanyoung Park
Bioinformatics 2023 (SCI)

WORKSHOPS

- [W4] **Capturing Functional Context of Genetic Pathways through Hyperedge Disentanglement**
 Yoonho Lee, Junseok Lee, Sangwoo Seo, Sungwon Kim, Yeongmin Kim, Chanyoung Park
ICLR 2025 - Workshop on Machine Learning for Genomics Explorations (MLGenX)
- [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 (Best Paper Award) - Workshop on Federated Learning for Data Mining and Graph Analytics
- [W2] **Interpretable Graph Model with Prototype-Based Graph Information Bottleneck**
 Sangwoo Seo, **Sungwon Kim**, Chanyoung Park
KDD 2024 (Best Paper Award) - Workshop on Human-Interpretable AI
- [W1] **Deep single-cell RNA-seq data clustering with graph prototypical contrastive learning**
 Junseok Lee, **Sungwon Kim**, Dongmin Hyun, Namkyeong Lee, Yejin Kim, Chanyoung Park
ICML 2023 - Workshop on Computational Biology

PROJECTS

- **3D Geometry-Based Graph Neural Networks for Engineering Simulation**, LG Electronics 2025 –
- **3D Geometry-Based Graph Neural Networks for Injection Molding**, LG Electronics 2024
- **Translating Korean Legal Case's Sentences into Common Terms**, AISoftKorea 2021– 2022
 Best award project at Seoul R&D research center (2021)
- **Sentence Similarity Model for Korean Legal Sentences**, AISoftKorea 2020
 Best award project at Seoul R&D research center (2020)
- **Big Data Analysis of Color Cognition in Older Adults and Disabled Children**, AISoftKorea 2017
 Development of Color Cognitive Test Kit and Multivariate Regression Analysis

HONORS & AWARDS

- **Best Paper Award** 2024
 KDD 2024 -Workshop on Federated Learning for Data Mining and Graph Analytics (FedKDD), Barcelona, Spain
- **Best Paper Award** 2024
 KDD 2024 -Workshop on Human-Interpretable AI, Barcelona, Spain
- **30th Samsung Humantech Paper Award** 2024
 Gold Prize
- **Seoul Renovation Challenge**, Seoul Business Agency 2020
 Awarded for the best team out of 444 participants [\[news\]](#)[\[news\]](#)
 Systems and methods for providing quantified AI answering services for legal questions
- **National University Rowing Conference**, Korean Rowing Association 2015
 First place, Crew of Korea University Rowing Team [\[YouTube\]](#)

PROFESSIONAL SERVICES

Conference Reviewer/Program Committee

- International Conference on Learning Representations (ICLR) 2025 – 2026
- The Web Conference (WWW) 2026
- Conference on Neural Information Processing Systems (NeurIPS) 2024 – 2025
- International Conference on Machine Learning (ICML) 2025
- Conference on Information and Knowledge Management (CIKM) - Short/Applied Research 2025

Journal Reviewer

	▪ IEEE Transactions on Network Science and Engineering (TSNE)	2025
	▪ IEEE Transactions on Neural Networks and Learning Systems (TNNLS)	2024
	▪ IEEE Transactions on Cognitive and Developmental Systems (TCDS)	2024
TEACHING EXPERIENCE	▪ AI Specialist Course , Samsung Electronics Teaching Assistant	2024
	▪ AI Specialist Course , Samsung Electronics Teaching Assistant	2023
	▪ DS503: Machine Learning for Data Science , KAIST Teaching Assistant	2023
	▪ AI Business Transformation Program , KAIST Researcher	2022
	▪ IE343: Statistical Machine Learning , KAIST Teaching Assistant	2022
TALKS AND SEMINARS	▪ Top Conference Session , Korea Computer Congress (KCC) Subgraph Federated Learning for Local Generalization	2025
	▪ Top Conference Session , Korea Software Congress (KSC) Task-Equivariant Graph Few-shot Learning	2023
REFERENCES	▪ Prof. Chanyoung Park , Assistant Professor, KAIST Email: cy.park@kaist.ac.kr	

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