

Sungwon Kim

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RESEARCH INTEREST

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

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

EDUCATION

KAIST (Korea Advanced Institute of Science and 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

- [C11] **EqGINO: Equivariant Geometry-Informed Fourier Neural Operators for 3D PDEs**
Sungwon Kim, Juho Song, Seungmin Shin, Guimok Cho, Sangkook Kim, Chanyoung Park
ICML 2026 - Forty-Third International Conference on Machine Learning
- [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) - 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**
Seungyeon 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

- [J2] **Physics-Embedded Graph Neural Operator for Interaction-Controlled Colloidal Aggregation**
Yongjoon Choe*, **Sungwon Kim***, Susan E. Burns†, Chanyoung Park†
Water Research 2026
- [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

WORKSHOPS

- [W6] **Physics-Embedded Graph Neural Operator for Interaction-Controlled Colloidal Aggregation**
Yongjoon Choe*, **Sungwon Kim***, Susan E. Burns†, Chanyoung Park†
KDD 2026 (Best Paper Award) - Workshop on Reliable Scientific Foundation Models (RelSciFM)
- [W5] **EqGINO: Equivariant Geometry-Informed Fourier Neural Operators for 3D PDEs**
Sungwon Kim, Juho Song, Seungmin Shin, Guimok Cho, Sangkook Kim, Chanyoung Park
ICLR 2026 (Oral) - Workshop on AI and Partial Differential Equations (AI&PDE)
- [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 Neural Surrogate Modeling for Fluid Flow Simulation**, LG Electronics 2026 –
- **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** 2026
KDD 2026 -Workshop on Reliable Scientific Foundation Models (RelSciFM), Jeju, Korea
- **Gold Reviewer** 2026

	ICML 2026 - Recognized as a Gold Reviewer (top 25% of reviewers)	
	▪ Google Research Award, Google “Coordinate-Invariant Neural Operators for Geometry-Transferable 3D PDE Solving” Awarded to Prof. Chanyoung Park (PI); serving as the lead student researcher on the funded project	2026
	▪ Best Paper Award KDD 2024 -Workshop on Federated Learning for Data Mining and Graph Analytics (FedKDD), Barcelona, Spain	2024
	▪ Best Paper Award KDD 2024 -Workshop on Human-Interpretable AI, Barcelona, Spain	2024
	▪ 30th Samsung Humantech Paper Award Gold Prize	2024
	▪ Seoul Innovation Challenge, Seoul Business Agency Awarded for the best team out of 444 participants [news][news] Systems and methods for providing quantified AI answering services for legal questions	2020
	▪ National University Rowing Conference, Korean Rowing Association First place, Crew of Korea University Rowing Team [YouTube]	2015
PROFESSIONAL SERVICES	Conference Reviewer/Program Committee ▪ Conference on Neural Information Processing Systems (NeurIPS) 2024 – 2026 ▪ International Conference on Machine Learning (ICML) 2025 – 2026 ▪ International Conference on Learning Representations (ICLR) 2025 – 2026 ▪ The Web Conference (WWW) 2026 ▪ 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	

[CV compiled on 2026-08-17]