

# JINWOO KIM

Ph.D. Student  
Graph & Geometric DL

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## Education

<b>M.S./Ph.D. in Computer Science</b> <i>Korea Advanced Institute of Science and Technology (KAIST)</i> <ul style="list-style-type: none"><li>• Advisor: Prof. Seunghoon Hong</li><li>• Research focus: Deep learning algorithms for graphs and structured data.</li></ul>	Mar 2021 – present South Korea
<b>B.S. in Brain Engineering and Computer Science (Double Major)</b> <i>Korea Advanced Institute of Science and Technology (KAIST)</i> <ul style="list-style-type: none"><li>• GPA 4.05/4.3 (<b>Summa Cum Laude</b>)</li></ul>	Mar 2016 – Feb 2021 South Korea

## Publications

(P: preprint, C: conference, J: journal, W: workshop, \*: equal contribution)

- [C8] **Simulation-Free Training of Neural ODEs on Paired Data**  
Semin Kim\*, Jaehoon Yoo\*, Jinwoo Kim, Yeonwoo Cha, Saehoon Kim, Seunghoon Hong  
*NeurIPS 2024*
- [W2] **Revisiting Random Walks for Learning on Graphs**  
Jinwoo Kim, Olga Zaghen\*, Ayhan Suleymanzade\*, Youngmin Ryou, Seunghoon Hong  
*ICML 2024 Workshop on Geometry-grounded Representation Learning and Generative Modeling*
- [W1] **Learning Symmetrization for Equivariance with Orbit Distance Minimization**  
Tien Dat Nguyen\*, Jinwoo Kim\*, Hongseok Yang, Seunghoon Hong  
*NeurIPS 2023 Workshop on Symmetry and Geometry in Neural Representations*
- [C7] **Learning Probabilistic Symmetrization for Architecture Agnostic Equivariance**  
Jinwoo Kim, Tien Dat Nguyen, Ayhan Suleymanzade, Hyeokjun An, Seunghoon Hong  
*NeurIPS 2023 (Spotlight Presentation)*
- [P1] **3D Denoisers are Good 2D Teachers: Molecular Pretraining via Denoising and Cross-Modal Distillation**  
Sungjun Cho, Dae-Woong Jeong, Sung Moon Ko, Jinwoo Kim, Sehui Han, Seunghoon Hong, Honglak Lee, Moontae Lee  
*arXiv 2023*
- [C6] **Universal Few-shot Learning of Dense Prediction Tasks with Visual Token Matching**  
Donggyun Kim, Jinwoo Kim, Seongwoong Cho, Chong Luo, Seunghoon Hong  
*ICLR 2023 (Outstanding Paper Award)*
- [C5] **Pure Transformers are Powerful Graph Learners**  
Jinwoo Kim, Tien Dat Nguyen, Seonwoo Min, Sungjun Cho, Moontae Lee, Honglak Lee, Seunghoon Hong  
*NeurIPS 2022*
- [C4] **Transformers meet Stochastic Block Models: Attention with Data-Adaptive Sparsity and Cost**  
Sungjun Cho, Seonwoo Min, Jinwoo Kim, Moontae Lee, Honglak Lee, Seunghoon Hong  
*NeurIPS 2022*
- [C3] **Equivariant Hypergraph Neural Networks**  
Jinwoo Kim, Saeyoon Oh, Sungjun Cho, Seunghoon Hong  
*ECCV 2022*
- [C2] **Transformers Generalize DeepSets and Can be Extended to Graphs and Hypergraphs**  
Jinwoo Kim, Saeyoon Oh, Seunghoon Hong  
*NeurIPS 2021*
- [C1] **SetVAE: Learning Hierarchical Composition for Generative Modeling of Set-Structured Data**  
Jinwoo Kim\*, Jaehoon Yoo\*, Juho Lee, Seunghoon Hong  
*CVPR 2021*
- [J1] **Spontaneous Retinal Waves Can Generate Long-Range Horizontal Connectivity in Visual Cortex**  
Jinwoo Kim\*, Min Song\*, Jaeson Jang, Se-Bum Paik  
*The Journal of Neuroscience 40(34) 2020*

## Work Experience

<b>LG AI Research Fundamental Research Lab (FRL)</b> <i>Research Intern (Mentors: Prof. Moontae Lee, Prof. Honglak Lee)</i> • Published 3 papers at NeurIPS & ECCV on transformers for graphs [C5, C3] and efficient transformers [C4].	Jan – Jul 2022 South Korea
<b>KAIST Vision and Learning Lab</b> <i>Undergraduate Research Intern (Mentors: Prof. Seunghoon Hong, Prof. Juho Lee)</i> • Published a paper at CVPR [C1] on transformer-based hierarchical variational autoencoders for sets.	2020 South Korea
<b>KAIST Visual Systems Neural Network Lab</b> <i>Undergraduate Research Intern (Mentor: Prof. Se-Bum Paik)</i> • Published a paper at JNeuro [J1] on a computational model of the prenatal wiring of the visual cortex.	2018 – 2019 South Korea
<b>Korea Institute of Basic Science (IBS) Social Neuroscience Group</b> <i>Undergraduate Research Assistant (Mentor: Dr. Doyun Lee)</i> • Assisted research on ensemble perception of motion.	2017 South Korea

## Honors & Awards

<b>Outstanding Researcher Award</b> <i>KAIST-Mila Prefrontal AI Research Center</i> • For studies on geometric deep learning and graph neural networks.	2024
<b>ELLIS Mobility Grant (€800)</b> <i>ICML Workshop on Geometry-grounded Representation Learning and Generative Modeling</i> • For Random Walk Neural Networks (ICML 2024 GRaM Workshop) [W2].	2024
<b>ICLR Outstanding Paper Award</b> <i>International Conference on Learning Representations (ICLR)</i> • As a coauthor of Visual Token Matching (ICLR 2023) [C6].	2023
<b>Samsung Humantech Paper Award Silver Prize (\$7,000)</b> <i>Samsung Electronics Co., Ltd.</i> • As a coauthor of Visual Token Matching (ICLR 2023) [C6].	2023
<b>Kwanjeong Education Foundation Scholarship (\$20,000)</b> <i>Kwanjeong Educational Foundation</i>	2022 – 2023
<b>Qualcomm Innovation Fellowship Korea (\$4,000)</b> <i>Qualcomm Technologies, Inc.</i> • For Higher-order Transformers (NeurIPS 2021) [C2].	2022
<b>KAIST Undergraduate Research Program Excellence Award</b> <i>Korea Advanced Institute of Science and Technology (KAIST)</i> • As a mentor for the undergraduate research project by Tien Dat Nguyen.	2022
<b>KAIST Engineering Innovator Award</b> <i>Korea Advanced Institute of Science and Technology (KAIST)</i> • Granted to 5 undergraduate students for outstanding achievements.	2020
<b>Korea National Science &amp; Technology Scholarship (\$13,000)</b> <i>Korea Ministry of Science and ICT</i>	2018 – 2019
<b>KAIST Alumni Fellowship (\$12,000)</b> <i>Korea Advanced Institute of Science and Technology (KAIST)</i>	2017 – 2020
<b>KAIST Presidential Fellowship (\$10,000)</b> <i>Korea Advanced Institute of Science and Technology (KAIST)</i>	2016 – 2020
<b>KAIST Dean's List</b> <i>Korea Advanced Institute of Science and Technology (KAIST)</i> • Awarded for outstanding academic performance 3 times (spring 2016, fall 2016, spring 2018).	2016 – 2018
<b>Hansung Scholarship for Gifted Students (\$10,000)</b> <i>Hansung Sonjaehan Scholarship Foundation</i>	2015 – 2016

## Skills

**Languages:** English (Conversational), Korean (Native), Japanese (Introductory)  
**Programming Languages:** Python, C, C++ R, MATLAB  
**Deep Learning Frameworks:** PyTorch, Lightning, PyG, Transformers, JAX, CUDA  
**Miscellaneous:** Linux, Git, Docker, L<sup>A</sup>T<sub>E</sub>X, Markdown, Adobe Illustrator

## Invited Talks

**Revisiting random walks for learning on graphs** (on [W2])  
@ KAIST-Mila Prefrontal AI Research Center (Host: Sungjin Ahn) Nov 2024

**Learning probabilistic symmetrization for architecture agnostic equivariance** (on [C7])  
@ Sungkyunkwan University (SKKU) (Host: Chang Woo Myung) Aug 2024  
@ Pohang University of Science and Technology (POSTECH) (Host: Sungsoo Ahn) Nov 2023

**Universal few-shot learning of dense prediction tasks with visual token matching** (on [C6])  
@ KAIST-Samsung Electronics DS Division Exchange Meetup (Host: Chulmoo Kang) Aug 2023

**Pure transformers are powerful graph learners** (on [C5])  
@ Microsoft USA (Host: Nabiha Asghar) Jan 2023  
@ NeurIPS 2022 at KAIST (Host: Dongkwan Kim) Nov 2022  
@ Learning on Graphs and Geometry Reading Group (LoGaG) (Host: Hannes Stärk) Aug 2022

**Higher-order transformers for sets, graphs, and hypergraphs** (on [C2])  
@ Qualcomm Korea (Host: Jaewon Choi) Jan 2023  
@ KAIST AI Workshop 21/22 (Host: Dongkwan Kim) Jan 2022  
@ NeurIPS 2021 Social: ML in Korea (Host: Jung-Woo Ha) Dec 2021

**Hierarchical variational autoencoders for generative modeling of sets** (on [C1])  
@ Naver AI Author Meetup for CVPR 2021 (Host: Jung-Woo Ha) Sep 2021  
@ Korean Conference on Computer Vision 2021 (Host: Jongwoo Lim) Sep 2021

**Retinal waves and prenatal wiring of the primary visual cortex** (on [J1])  
@ Society for Neuroscience, Chicago, IL, US Oct 2019

## Teaching

**Teaching Assistant, KAIST School of Computing**

- Undergraduate Research Program (URP) 2022, 2024
- Introduction to Deep Learning (CS492I) 2021, 2022, 2023
- Computer Vision (CS576) 2022, 2023
- School of Computing Colloquium (CS966/CS986) 2021

**Teaching Assistant, Samsung Electronics**

- Samsung Research AI Expert Program 2021–2024

**Student Mentoring and Collaboration**

- Nayun Kim, B.S. Student @ KAIST 2024 – present
- Jiyun Park, B.S. Student @ KAIST 2024 – present
- Youngmin Ryou, B.S. Student @ KAIST (on [W2]) 2023 – present
- Nicole Shen, B.S. Student @ MIT 2024
- Semin Kim, M.S. Student @ KAIST (on [C8]) → Ph.D. Student @ KAIST 2023 – 2024
- Ayhan Suleymanzade, B.S. Student @ KAIST (on [C7, W2]) 2023 – 2024
- Olga Zaghen, M.S. Student @ UniTrento (on [W2]) → Ph.D. Student @ UvA Amsterdam 2023
- Tien Dat Nguyen, B.S. Student @ KAIST (on [C5, C7, W2]) → M.S. Student @ UWaterloo 2021 – 2023
- Ali Ahmed Sheikh, B.S. Student @ KAIST 2023
- Hyeokjun An, M.S. Student @ KAIST (on [C7]) 2023
- Daniel Sungho Jung, B.S. Student @ Penn State → Ph.D. Student @ SNU 2021
- Saeyoon Oh, B.S. Student @ KAIST (on [C2, C3]) → Engineer @ FuriosaAI 2021

## Academic Services

**Conference Reviewer:** AISTATS 2025, ICLR 2025, NeurIPS 2022–2024, ICML 2023–2024, LoG 2022–2024, ICML GRaM Workshop 2024, CVPR 2022, ACCV 2022  
**Journal Reviewer:** TMLR 2024, Neural Networks 2023

## Projects

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<b>Extending Language Models for Physical Data Understanding</b> <i>Korea National Research Foundation (NRF)</i>	2024 – 2025
<b>Image Inpainting with Visual Commonsense Reasoning</b> <i>Korea Ministry of Science and ICT</i>	2021 – 2023
<b>Cooperative Intelligence for Heterogeneous Robots</b> <i>Korea National Research Foundation (NRF)</i>	2021 – 2023

## References

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<b>Prof. Seunghoon Hong</b> , Associate Professor at KAIST	<a href="mailto:seunghoon.hong@kaist.ac.kr">seunghoon.hong@kaist.ac.kr</a>
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