JINWOO KIM

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Academic Placement and Employment

KAIST, Postdoctoral Researcher; Mandatory Military Service — Mar 2026 – Feb 2027 (expected)
Host: Seunghoon Hong — South Korea

New York University, Visiting Scholar — Nov 2025 – Jan 2026
Host: Kyunghyun Cho, Rajesh Ranganath — New York, NY

LG AI Research, Research Intern — Jan – Jul 2022
Host: Moontae Lee, Honglak Lee — South Korea

Research Interests

My focus is in making deep learning models that generalize better out of their training data so that they can be used to solve challenging problems, such as those in scientific domains. I have been studying this primarily from the viewpoint of invariances, focusing on all-purpose deep neural networks that can reliably reason upon novel transformed inputs. I often use tools from theories of graphs, (semi)groups and manifolds, and Markov processes such as random walks, diffusions and flows.

Education

M.S./Ph.D. in Computer Science — Mar 2021 – Feb 2026
Korea Advanced Institute of Science and Technology (KAIST) — South Korea
Advisor: Seunghoon Hong
Thesis: Architecture-Agnostic Invariances for Deep Learning
KAIST CoE Best Dissertation Award

B.S. in Brain Engineering and Computer Science (Double Major) — Mar 2016 – Feb 2021
Korea Advanced Institute of Science and Technology (KAIST) — South Korea
GPA 4.05/4.3 (Summa Cum Laude)

Publications

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

[P2] **Inverting Data Transformations via Diffusion Sampling**
Jinwoo Kim*, Sékou-Oumar Kaba*, Jiyun Park, Seunghoon Hong†, Siamak Ravanbakhsh†
Under review 2026

[P1] **Flock: A Knowledge Graph Foundation Model via Learning on Random Walks**
Jinwoo Kim*, Xingyue Huang*, Krzysztof Olejniczak, Kyungbin Min, Michael Bronstein, Seunghoon Hong, İsmail İlkan Ceylan
ICLR 2026

[C11] **Sequence Modeling with Spectral Mean Flows**
Jinwoo Kim, Max Beier, Petar Bevanda, Nayun Kim, Seunghoon Hong
NeurIPS 2025

[C10] **Revisiting Random Walks for Learning on Graphs**
Jinwoo Kim, Olga Zaghen*, Ayhan Suleymanzade*, Youngmin Ryou, Seunghoon Hong
ICLR 2025; ICML 2024 GRaM Workshop
Spotlight Presentation (380/11672=3.26%)

[C9] **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
AAAI 2025
Oral Presentation

[C8] **Simulation-Free Training of Neural ODEs on Paired Data**
Semin Kim*, Jaehoon Yoo*, Jinwoo Kim, Yeonwoo Cha, Saehoon Kim, Seunghoon Hong
NeurIPS 2024

[W1] **Learning Symmetrization for Equivariance with Orbit Distance Minimization**
Tien Dat Nguyen*, Jinwoo Kim*, Hongseok Yang, Seunghoon Hong
NeurIPS 2023 NeurReps Workshop

[C7] **Learning Probabilistic Symmetrization for Architecture Agnostic Equivariance**
Jinwoo Kim, Tien Dat Nguyen, Ayhan Suleymanzade, Hyeokjun An, Seunghoon Hong
NeurIPS 2023
Spotlight Presentation (378/12345=3.06%)

[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 (4/4955=0.08%)

[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

Honors

Awards

- **Best Ph.D. Dissertation Award**, KAIST College of Engineering — 2026
- **Outstanding Researcher Award**, KAIST-Mila Prefrontal AI Research Center — 2024
- **ELLIS Mobility Grant** [C10], ICML 2024 GRaM Workshop — 2024
- **Outstanding Paper Award** [C6], ICLR 2023 — 2023
- **Samsung Humantech Paper Award** [C6], Silver Prize — 2023
- **Qualcomm Innovation Fellowship Korea** [C2] — 2022
- **KAIST Engineering Innovator Award**, 1 of 5 Recipients in the College of Engineering — 2020

Scholarships and fellowships

- **Kwanjeong Education Foundation Scholarship** — 2022 – 2023
- **Korea National Science & Technology Scholarship** — 2018 – 2019
- **KAIST Alumni Fellowship** — 2017 – 2020
- **KAIST Presidential Fellowship** — 2016 – 2020
- **Hansung Scholarship for Gifted Students** — 2015 – 2016

Invited Talks

Sequence Modeling with Spectral Mean Flows [C11]
- Ben-Gurion University of the Negev (BGU) (Host: Ilan Naiman) — Dec 2025

Architecture-Agnostic Invariances for Deep Learning [C7, W1, C10]
- Mila – Quebec AI Institute (Host: Minsu Kim, Junyeob Baek) — Jul 2025
- KAIST AI899 Geometric DL (Host: Sungsoo Ahn) — May 2025
- Mila – Quebec AI Institute (Host: Siamak Ravanbakhsh, Sékou-Oumar Kaba) — Dec 2024
- KAIST–Mila Prefrontal AI Research Center (Host: Sungjin Ahn) — Nov 2024
- 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 [C6]
• KAIST–Samsung Electronics DS Division Exchange Meetup (Host: Chulmoo Kang) Aug 2023

Pure Transformers are Powerful Graph Learners [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 [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 [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 Primary Visual Cortex [J1]
• Society for Neuroscience, Chicago, IL, US Oct 2019

Academic Services

Conference Reviewer: AISTATS 2025–2026, ICLR 2025–2026, ICML 2023–2026, NeurIPS 2022–2025, IJCNN 2025, LoG 2022–2025, TAG-DS 2025, IJCNN 2025, ICCV 2025 SP4V Workshop, ICML 2024 GRaM Workshop, CVPR 2022, ACCV 2022
Journal Reviewer: Neural Networks 2023, 2025, IJCV 2025, TMLR 2024

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
• Chanhyuk Lee, M.S. Student @ KAIST 2025 – present
• Jiyun Park, B.S. Student @ KAIST [P2] → M.S. Student @ KAIST 2024 – present
• Kyungbin Min, B.S. Student @ KAIST [P1] 2025 – present
• Nayun Kim, B.S. Student @ KAIST [C11] → Intern @ EPFL LTS4 2024
• Youngmin Ryou, B.S. Student @ KAIST [C10] → on leave for mandatory military service 2023 – 2024
• Nicole Shen, B.S. Student @ MIT → Intern @ MIT LIDS 2024
• Semin Kim, M.S. Student @ KAIST [C8] → Ph.D. Student @ KAIST 2023 – 2024
• Ayhan Suleymanzade, B.S. Student @ KAIST [C7, C10] → Intern @ TU Munich 2023 – 2024
• Olga Zaghen, M.S. Student @ UniTrento [C10] → Ph.D. Student @ UvA Amsterdam 2023
• Tien Dat Nguyen, B.S. Student @ KAIST [C5, C7, W1] → M.S. Student @ UWaterloo 2021 – 2023
• Daniel Sungho Jung, B.S. Student @ Penn State → Ph.D. Student @ SNU 2021
• Saeyoon Oh, B.S. Student @ KAIST [C2, C3] → Engineer @ FuriosaAI 2021

References

Seunghoon Hong, Associate Professor at KAIST seunghoon.hong@kaist.ac.kr
Kyunghyun Cho, Full Professor at New York University kyunghyun.cho@nyu.edu
Moontae Lee, Head of Superintelligence Lab at LG AI Research moontae.lee@lgresearch.ai
Siamak Ravanbakhsh, Associate Professor at McGill University siamak.ravanbakhsh@mcgill.ca
İsmail İlkan Ceylan, Associate Member at University of Oxford ismail.ceylan@cs.ox.ac.uk