

Hoon Lee

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Research Interest

I'm interested in physical AI for dexterous humanoid manipulation. My current work focuses on real2sim2real pipelines that connect real-world data, simulation, learning models, and real-world deployment, with reinforcement learning as a core training paradigm.

Previous works include:

- Sample & Compute Efficient RL ([RSS'26](#), [RLC'26](#), [ICLR'26](#), [ICML'25](#), [ICLR'25](#), [ICML'24](#), [NeurIPS'23](#)).
- RL in General ([RLC'26](#), [NeurIPS'24](#), [ICML'24](#), [NeurIPS'23](#), [ICML'23](#)).
- Robotics ([arXiv'26](#), [arXiv'26](#), [IROS'26](#), [ICRA'26](#), [RA-L'25](#)).
- RLVR ([COLMw'25](#), [SIGIR'22](#), [WWW'22](#)).

Education

2022.03 – 2026.02 **KAIST, PhD in Artificial Intelligence** (Advisor: [Jaegul Choo](#)).
Thesis: *Maintaining Plasticity for Scalable Deep Reinforcement Learning*.
Committee: [Jaegul Choo](#), [Chulhee Yun](#), [Kimin Lee](#), [Clare Lyle](#), [Peter Stone](#).
[slide](#)

2020.03 – 2022.02 **KAIST, MS in Artificial Intelligence**.
Thesis: *Personalized Draft Recommendation System for Victory in League of Legends*.
[thesis](#)

2014.03 – 2020.02 **Korea University, BS in Computer Science**.

Work Experience

2026.01 – Current **Senior Research Scientist @ Holiday Robotics**
Developing a real2sim2real pipeline for dexterous manipulation.

2025.05 – 2025.11 **Research Intern @ Meta Reality Labs** (Mentor: [Nitin Kamra](#), [Karl Ridgeway](#))
Designed an autonomous reward design agent for dexterous manipulation.
[paper](#)

2025.02 – 2025.04 **Research Intern @ Krafton AI** (Mentor: [Dongmin Park](#), [Jongho Park](#))
Developed an LLM-based chess-playing agent by RLVR.
[paper](#)

2024.02 – 2024.08 **Research Intern @ Sony AI** (Mentor: [Takuma Seno](#), [Kaushik Subramanian](#), [Peter Stone](#))
Developed a vision-based autonomous racing agent in GranTurismo 7.
[paper](#), [video](#)

2021.09 – 2021.11 **Research Intern @ Kakao Enterprise** (Mentor: [Kyushik Min](#))
Implemented an open-source reinforcement learning library for research.
[code](#) (300+ ☆)

2019.03 – 2019.07 **Research Intern @ Neowiz** (Mentor: [Jaejin Yoon](#))
Developed a reinforcement learning agent for the tactical RPG game, Browndust.
[poster](#)

Research Topics and Publications

Sample & Compute Efficient RL

- RSS'26
(outstanding 🏆) **FlashSAC: Fast and Stable Off-Policy RL for High-Dimensional Robot Control**
Donghu Kim*, Youngdo Lee*, Minho Park, Kinam Kim, Takuma Seno, Aswin Nahendra, Sehee Min, Daniel Palnicek, Florian Vogt, Danica Kraig, Jan Peters, Jaegul Choo[†], **Hojoon Lee[†]**.
[paper](#), [website](#), [code](#) (400+☆)
- RLC'26 **Unleashing the Architectural Potential of RL in Visual Continuous Control**
Donghu Kim, Youngdo Lee, **Hojoon Lee**, Johan Obando-Ceron, ByungKun Lee, Aaron Courville, Pablo Samuel Castro, Jaegul Choo, Clare Lyle.
[paper](#)
- ICLR'26
(oral) **FIRE: Frobenius-Isometry Reinitialization for Balancing Stability-Plasticity Tradeoff**
Isaac Han, Sangyeon Park, Seungwon Oh, Donghu Kim, **Hojoon Lee[†]**, Kyungjoon Kim[†].
[paper](#), [website](#)
- ICML'25
(spotlight) **SimbaV2: Hyperspherical Normalization for Scalable RL**
Hojoon Lee*, Youngdo Lee*, Takuma Seno, Donghu Kim, Peter Stone, Jaegul Choo.
[paper](#), [website](#), [code](#) (100+☆)
- ICLR'25
(spotlight) **Simba: Simplicity Bias for Scaling Up Parameters in Deep RL**
Hojoon Lee*, Dongyoon Hwang*, Donghu Kim, Hyunseung Kim, Jun Jet Tai, Kaushik Subramanian, Peter R. Wurman, Jaegul Choo, Peter Stone, Takuma Seno.
[paper](#), [website](#), [code](#) (100+☆)
- ICML'24 **Slow and Steady Wins the Race: Maintaining Plasticity with Hare and Tortoise**
Hojoon Lee, Hyeonseo Cho, Hyunseung Kim, Donghu Kim, Jaegul Choo, Clare Lyle.
[paper](#)
- NeurIPS'23 **PLASTIC: Improving Input and Label Plasticity for Sample-Efficient RL**
Hojoon Lee*, Hanseul Cho*, Hyunseung Kim*, Daehoon Gwak, Joonkee Kim, Jaegul Choo, Seyoung Yun, Chulhee Yun.
[paper](#)

RL (Reward Design; Skill-Discovery; Representation Learning)

- RLC'26 **RDA: Reward Design Agent for Reinforcement Learning**
Hojoon Lee, Ajay Subramanian, Ben Abbatematteo, Pedro Matias, Vijay Veerabadrán, Karl Ridgeway, Nitin Kamra.
[paper](#), [website](#)
- NeurIPS'24 **Do's and Don'ts: Learning Desirable Skills with Instruction Videos**
Hyunseung Kim, Byungkun Lee, **Hojoon Lee**, Dongyoon Hwang, Donghu Kim, Jaegul Choo.
[paper](#)
- ICML'24 **Investigating Pre-training Objectives for Generalization in Vision-Based RL**
Donghu Kim*, **Hojoon Lee***, Kyungmin Lee*, Dongyoon Hwang, Jaegul Choo.
[paper](#)

NeurIPS'23 **Learning to Discover Skills through Guidance**
Hyunseung Kim, Byungkun Lee*, **Hojoon Lee**, Dongyoon Hwang, Kyuhsik Min, Jaegul Choo.*
[paper](#)

ICML'23 **On the importance of Feature Decorrelation for Representation Learning in RL**
***Hojoon Lee**, Gwanho Lee, Dongyoon Hwang, Hyunho Lee, Byungkun Lee, Jaegul Choo.*
[paper](#)

Robotics

arXiv'26 **See Like a Robot: Robot-Centric PointMaps for VLA**
Byungkun Lee, Dongyoon Hwang*, Minho Park, Dongjin Kim, **Hojoon Lee**, Jaegul Choo.*
[paper](#), [website](#)

arXiv'26 **PHUMA: Physically Grounded Humanoid Locomotion Dataset**
Kyungmin Lee, Sibeon Kim*, Minho Park, Dongyoon Hwang, **Hojoon Lee**[†], Jaegul Choo[†].*
[paper](#), [website](#), [code](#) (200+☆)

IROS'26 **3D HAMSTER: Hierarchical VLAs through 3D Trajectory Guidance**
Dongyoon Hwang, Byungkun Lee*, Dongjin Kim, Hyojin Jang, Hoiyeong Jin, Jueun Mun, Minho Park, **Hojoon Lee**, Hyunseung Kim, Jaegul Choo.*
[paper](#), [website](#), [code](#)

ICRA'26 **ACG: Action Coherence Guidance For Flow-based VLA Models.**
Minho Park, Kinam Kim*, Junha Hyung, Hyojin Jang, Hoiyeong Jin, Jooyeol Yun, **Hojoon Lee**[†], Jaegul Choo[†].*
[paper](#), [website](#), [code](#)

RA-L'25 **A Champion-level Vision-based Racing Agent for Competitive Racing in GT7.**
Hojoon Lee, Takuma Seno*, Jun Jet Tai*, Kaushik Subramanian, Kenta Kawamoto, Peter Stone, Peter R.Wurman.*
[paper](#), [video](#)

RLVR

CoLMw'25 **Can Large Language Models Develop Strategic Reasoning? Post-training insights from Learning to Play Chess**
Dongyoon Hwang, **Hojoon Lee***, Jaegul Choo, Dongmin Park, Jongho Park.*
[paper](#)

SIGIR'22
(honorable 🏆) **Towards Validating Long-Term User Feedback in Interactive RecSys**
***Hojoon Lee**, Dongyoon Hwang, Kyushik Min, Jaegul Choo.*
[paper](#)

WWW'22 **DraftRec: Personalized Draft Recommendation System for Victory in MOBA games**
Hojoon Lee, Dongyoon Hwang*, Hyunseung Kim, Byungkun Lee, Jaegul Choo*
[paper](#)

Mentoring

2026.05 – 2026.08 Yoonsang Oh (SNU BS → KAIST MS/PhD)

2025.07 – 2026.08 [Isaac Han](#) (GIST PhD)

2025.03 – 2026.08 [Kyungmin Lee](#) (KAIST MS/PhD)

2025.03 – 2026.08 [Sibeen Kim](#) (KAIST MS)

2025.03 – 2025.10 [Minho Park](#) (KAIST PhD)

2024.10 – 2026.02 [Donghu Kim](#) (KAIST MS → Holiday Robotics)

2024.10 – 2026.02 [Youngdo Lee](#) (KAIST MS → Holiday Robotics)

2023.09 – 2024.02 [Hyeonseo Cho](#) (Konkuk BS → KAIST MS/PhD)

2021.09 – 2023.02 [Dongyoon Hwang](#) (Korea Univ BS → KAIST PhD)

2021.09 – 2023.02 [Hyunseung Kim](#) (Korea Univ BS → KAIST PhD → Krafton AI)

Talks and Presentations

2024.11 BeNeRL: Designing Neural Network Architecture for Deep RL [slide](#)

2024.05 Sony AI: Towards Plastic Neural Network [slide](#)

2023.12 RL Korea: Pretraining for Intelligent Reinforcement Learning Agent [slide](#)

Honors and Awards

2022.10 ACM SIGIR: Best Short Paper Honorable Mention Award

2023.06 Crevisse Partners: CIKM Travel Award (3,000 USD)

2022.10 ACM SIGIR: Best Short Paper Honorable Mention Award

2021.03 Korea Government: Full Academic Scholarship (10,000 USD)

2019.12 Korea University: Graduation Project Award (1,500 USD)

2017.09 Seongnam City: College Scholarship (4,000 USD)

2017.02 US Army: General Paik Sun Yup Leadership Award [article](#)

Academic Services

Reviewer NeurIPS'24-26, ICML'24-26, ICLR'24-26, AAAI'25, CoLLAs'25-26, CoG'25, RLC'26, WACV'26, ICRA'26, IROS'26

Military Services

2015.04-2017.03 KATUSA (Korean Augmentation to the U.S. Army), Discharged as Sergeant