Hojoon 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, 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 — **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 (200+☆)

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 Veerabadran, 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.*
coming soon

arXiv'26 PHUMA: Physically Grounded Humanoid Locomotion Dataset
Kyungmin Lee, Sibeen 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 (HM) 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

2025.03 – 2025.10 Isaac Han: Advised on ICLR'26 (GIST PhD)

2025.03 – 2025.10 Kyungmin Lee: Advised on Preprint'26 (KAIST PhD)

2025.03 – 2025.10 Sibeen Kim: Advised on Preprint'26 (KAIST MS)

2025.03 – 2025.10 Minho Park: Advised on ICRA'26 (KAIST PhD)

2024.10 – 2025.03 Donghu Kim: Advised on ICML'24, RSS'26 (KAIST MS → Holiday Robotics)

2024.10 – 2025.03 Youngdo Lee: Advised on ICML'24, RSS'26 (KAIST MS → Holiday Robotics)

2023.09 – 2024.02 Hyeonseo Cho: Mentored on ICML'24 (Konkuk BS → KAIST MS)

2021.09 – 2023.02 Dongyoon Hwang: Co-authored 5 papers (Korea Univ BS → KAIST PhD)

2021.09 – 2023.02 Hyunseung Kim: Co-authored 4 papers (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*

2024.02 **Konkuk University**: Towards Plastic Neural Network *slide*

2023.12 **RL Korea**: Pretraining for Intelligent Reinforcement Learning Agent *slide*

Honors and Awards

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, ICRA'26, IROS'26, CoG'25

Skills

Technical C, Python, PyTorch, Jax, Tensorflow, Git, CI/CD, Docker, Isaac, Mujoco

Lingual Korean (native), English (fluent)

Military Services

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