Junwoo Chang

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Research Interests

Reinforcement Learning, Geometric Deep Learning, Robotic Manipulation and Locomotion, Diffusion Models

Education

2024 - present Master's Degree at **Yonsei University** (Advisor: Prof. Jongeun Choi)
2018 - 2024 Bachelor's Degree at **Yonsei University**
2-year absence for military service (Jul. 2019 – Jan. 2021)

Publications

(*: equal contribution, †: equal advice)

- **Junwoo Chang**, Minwoo Park, Joohwan Seo, Roberto Horowitz, Jongmin Lee†, Jongeun Choi†
Partially Equivariant Reinforcement Learning in Symmetry-Breaking Environments
Preprint (under review)

- **Junwoo Chang**, Joseph Park, Roberto Horowitz, Jongmin Lee†, Jongeun Choi†
Group-Invariant Unsupervised Skill Discovery: Symmetry-aware Skill Representations for Generalizable Behavior
Preprint (under review)

- Jebeom Chae*, **Junwoo Chang***, Seungho Yeom, Yujin Kim, Jongeun Choi
Multi-Robot Motion Planning from Vision and Language using Heat-Inspired Diffusion
Preprint (under review)

- Minwoo Park*, **Junwoo Chang***, Jongeun Choi, Roberto Horowitz
Symmetry-Aware Steering of Equivariant Diffusion Policies: Benefits and Limits
Preprint (under review)

- Joohwan Seo, Soochul Yoo, **Junwoo Chang**, Hyunseok An, Hyunwoo Ryu, Soomi Lee, Arvind Kruthiventy, Jongeun Choi, Roberto Horowitz
SE(3)-Equivariant Robot Learning and Control: A Tutorial Survey
International Journal of Control, Automation and Systems **(IJCAS), 2025**

- Hyunwoo Ryu, Jiwoo Kim, Hyunseok An, **Junwoo Chang**, Joohwan Seo, Taehan Kim, Yubin Kim, Chaewon Hwang, Jongeun Choi, Roberto Horowitz
Diffusion-EDFs: Bi-equivariant Denoising Generative Modeling on SE(3) for Visual Robotic Manipulation
Computer Vision and Pattern Recognition **(CVPR), 2024 (Highlight)**

- **Junwoo Chang***, Hyunwoo Ryu*, Jiwoo Kim, Soochul Yoo, Joohwan Seo, Nikhil Potu Surya Prakash, Jongeun Choi, Roberto Horowitz
Denoising Heat-inspired Diffusion with Insulators for Collision Free Motion Planning
NeurIPS 2023 Workshop on Diffusion Models

Awards and Scholarships

Best Technical Presentation Award Oct. 2023
The 5th Yonsei University Mechanical Engineering Graduate Student Academic Conference

Yonsei Jinri Scholarship Dec. 2021, Jul. 2022, Dec. 2022
Recognized for sustained academic excellence (three consecutive awards)

Undergraduate Academic Excellence Honors 2021
High Honors (Spring 2021), Honors (Fall 2021)

Research Experience

Machine Learning and Control Systems Laboratory, Yonsei University Mar. 2024 – Present
Graduate Researcher, Advisor: Prof. Jongeun Choi
– Research on group equivariant and diffusion-based robot learning
– Developing partially equivariant reinforcement learning methods for symmetry-breaking tasks

Machine Learning and Control Systems Laboratory, Yonsei University Sep. 2022 – Feb. 2024
Undergraduate Research Intern, Advisor: Prof. Jongeun Choi
– **Hyundai Motor Project:** Self-supervised representation learning for autonomous driving
– Integrated heat-transfer dynamics with diffusion models for vision-based navigation
– **Undergraduate Thesis:** *Imaginary Experience Replay: Generating Redundant Transitions for Sparse and Negative Rewards*

Human–Centered AI Robotics Laboratory, Yonsei University Jun. 2022 – Sep. 2022
Undergraduate Research Intern, Advisor: Prof. Dongjun Shin
– Designed a 5-DOF snake robot for in-pipe locomotion and haptic teleoperation

Project Experience

Technical Demonstration of Diffusion-EDFs Aug. 2023 – Oct. 2023
– Demonstrated real-world robotic manipulation using the Diffusion-EDFs
– Awarded Best Technical Demonstration (top project at conference)

Volunteer Research, Yonsei Rehabilitation Hospital Jun. 2022 – Jan. 2023
– Designed assistive systems for children with mental and physical disabilities
– Developed a collision-aware wheelchair assistant and a posture correction aid for children

Teaching

Teaching Assistant
Mechanical Engineering Laboratory II (Yonsei MEU3005-01), Prof. Jongeun Choi Spring 2024

Academic Service

– Reviewer, IEEE International Conference on Robotics and Automation (ICRA) 2026
– Reviewer, IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) 2026
– Reviewer, IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM) 2024

Military Service

Republic of Korea Army, K-SAM Pegasus Air Defense System Operator Jul. 2019 – Jan. 2021

Skills

Programming	C, C++, Python (PyTorch, JAX, TensorFlow), MATLAB, ROS
Hardware	Franka Emika, Kinova Gen2, RB-Y1, TurtleBot3, OptiTrack, Arduino, Raspberry Pi
Tools	MoveIt, Git, Linux, LaTeX
Theory	Reinforcement Learning, Representation Theory, Group Theory, Diffusion Models