

Jeongmin Lee

I am currently a senior research engineer at Holiday Robotics. I received my Ph.D. in Mechanical Engineering from Seoul National University under the supervision of Prof. Dongjun Lee (Interactive & Networked Robotics Laboratory). My research focuses on intelligence for contact-rich robotic manipulation. During my Ph.D., I worked on contact modeling, solvers for high-performance robotic simulators, and model-based algorithms for manipulation. Currently, I am building simulation-based learning and data platforms, alongside sim-to-real transfer, for the humanoid robot FRIDAY.

EDUCATION

- Seoul National University** | *Seoul, S. Korea* Mar. 2019 - Aug. 2024
- M.S.-Ph.D. in Mechanical Engineering
- Seoul National University** | *Seoul, S. Korea* Mar. 2015 - Feb. 2019
- B.S. in Mechanical and Aerospace Engineering

EXPERIENCE

- Senior Research Engineer, Holiday Robotics** Mar. 2025 -
- Research on physics simulation and humanoid manipulation
- Postdoctoral Researcher, SNU INRoL** Sep. 2024 - Feb. 2025
- Mechanics & Control group leading
- Graduate Research Assistant, SNU INRoL** Mar. 2019 - Aug. 2024
- Advisor: Dongjun Lee
 - Research on developing high performance robot simulation and contact manipulation
- Research Intern, Korea Institute of Science and Technology (KIST)** May 2018 - Dec. 2018
- Developed a Lidar localization algorithm based on CNN and ICP

AWARDS AND HONORS

- RSS Pioneers 2025**
- Title: Enhancing Physics Simulators for Reliable and Scalable Data Generation ([Link](#))
- Outstanding Doctoral Thesis Award 2024 (SNU, KSME)**
- Title: Efficient and Scalable Methods for Contact Manipulation: From Simulation to Estimation and Planning
- Runner-up Award of the Embracing Contacts Workshop in ICRA 2023**
- A differentiable geometry & optimization algorithm for state estimation during contact
- Best Manipulation Paper Award Finalist in ICRA 2021**
- Flexible cable simulation algorithm and sim-to-real verification
- Outstanding BS Thesis Presentation Award**
- Localization based on Lidar image using CNN and ICP

PUBLICATIONS

Journal Articles

- Minji Lee, **Jeongmin Lee**, and Dongjun Lee, Narrow Passage Path Planning via Homotopy-Preserving Collision Constraint Interpolation, *IEEE Transactions on Robotics* 2026.
- **Jeongmin Lee**, Minji Lee, Sunkyung Park, Jinhee Yun, and Dongjun Lee, Variations of Augmented Lagrangian for Robotic Multi-Contact Simulation, *IEEE Transactions on Robotics* 2025.
- Jeongseob Lee, Doyoon Kong, Hojun Cha, **Jeongmin Lee**, Dongseok Ryu, Hocheol Shin, Dongjun Lee, Wrench Control of Dual-Arm Robot on Flexible Base with Supporting Contact Surface, *IEEE Transactions on Robotics* 2025.
- Minji Lee, **Jeongmin Lee**, Dongjun Lee, Narrow Passage Path Planning via Homotopy-Preserving Collision Constraint Interpolation, *IEEE Transactions on Robotics* 2025.
- **Jeongmin Lee**, Minji Lee, and Dongjun Lee, Large-Dimensional Multibody Dynamics Simulation using Contact Nodalization and Diagonalization, *IEEE Transactions on Robotics* 2022.

Conference Proceedings

- Jinhee Yun, **Jeongmin Lee**, Sunkyung Park, and Dongjun Lee, Amortized NeuralSDF-Mesh Collision Detection for Robotic Contact Simulation, ICRA 2026.
- Yejun Song, Seoki An, Somang Lee, **Jeongmin Lee**, Jeongseob Lee, Geunsu Yoo, and Dongjun Lee, Differentiable Optimization-Based Modular Planning Framework for Pick-and-Place with Regrasp, ICRA 2026.
- Heeseong Lee, Sungpyo Sagong, Minhyeong Lee, **Jeongmin Lee**, Dongjun Lee, Efficient Reinforcement Learning for Sparse-Reward Autonomous Car Racing using Imperfect Demonstrations, IROS 2025.
- Sunkyung Park, **Jeongmin Lee** and Dongjun Lee, Shape Abstraction via Marching Differentiable Support Functions, CVPR 2025 (Highlight).
- **Jeongmin Lee**, Minji Lee, Sunkyung Park and Dongjun Lee, Efficient Gradient-Based Inference for Manipulation Planning in Contact Factor Graphs, ICRA 2025.
- Minji Lee, **Jeongmin Lee**, and Dongjun Lee, Narrow Passage Path Planning using Collision Constraint Interpolation, ICRA 2025.
- Harim Ji, Hyunsu Kim, **Jeongmin Lee**, Somang Lee, Seoki An, Jinuk Heo, Youngseon Lee, Yongseok Lee, and Dongjun Lee, GPU-Accelerated Subsystem-Based ADMM for Large-Scale Interactive Simulation, ICRA 2025.
- Seoki An, Somang Lee, **Jeongmin Lee**, Sunkyung Park, Dongjun Lee, Collision Detection between Smooth Convex Bodies via Riemannian Optimization Framework, IROS 2024.
- **Jeongmin Lee***, Minji Lee*, and Dongjun Lee, Uncertain Pose Estimation during Contact Tasks using Differentiable Contact Features, RSS 2023.
- **Jeongmin Lee**, Minji Lee, and Dongjun Lee, Modular and Parallelizable Multibody Physics Simulation via Subsystem-Based ADMM, ICRA 2023.
- Minji Lee, **Jeongmin Lee**, and Dongjun Lee. Differentiable Dynamics Simulation Using Invariant Contact Mapping and Damped Contact Force, ICRA 2023.
- Minji Lee, **Jeongmin Lee**, Jaemin Yoon, and Dongjun Lee, Real-Time Physically-Accurate Simulation of Robotic Snap Connection Process, IROS 2021.
- **Jeongmin Lee**, Minji Lee, Jaemin Yoon, and Dongjun Lee, A Parallelized Iterative Algorithm for Real-Time Simulation of Long Flexible Cable Manipulation, ICRA 2021. (**Best Manipulation Paper Award Finalist**)

Under Review/In Preparation

- **Jeongmin Lee**, Minji Lee, and Dongjun Lee, Differentiable Support Functions: Theory and Application to Contact State Estimation during Manipulation, In Preparation.

Workshops

- Minji Lee*, **Jeongmin Lee***, and Dongjun Lee, Assembly Path Planning via Variable Lifting and Physics Simulation, Robot Assembly Workshop in RSS 2023
- **Jeongmin Lee***, Minji Lee*, and Dongjun Lee, A Differentiable Formulation for Uncertain Pose Estimation during Contact, Embracing Contacts Workshop in ICRA 2023. (**Runner-up Award**)
- Minji Lee, **Jeongmin Lee**, and Dongjun Lee, Interactive Real-time Simulation of Robotic Snap Connection Process, Representing and Manipulating Deformable Objects in ICRA 2021.

GOVERNMENT AND INDUSTRIAL PROJECTS

- | | |
|--|-----------------------|
| Development of a Digital Twin Platform for Precision Assembly Tasks | Apr. 2024 - Feb. 2025 |
| <ul style="list-style-type: none">• Ministry of Trade, Industry and Energy (MOTIE)• Developing precise geometric and physical models and solvers for contact interactions | |
| Virtual Environment and Contact Manipulation Module for Nuclear Power Plants | Mar. 2022 - Feb. 2025 |
| <ul style="list-style-type: none">• Ministry of Science and ICT (MSIT)• Developing motion planning algorithms through contact for different emergency tasks | |
| Autonomous Dish Placing Framework using Robot Manipulator | Jan. 2022 - Oct. 2022 |
| <ul style="list-style-type: none">• Samsung Research• Designed dish motion planning and state estimation module utilizing sensor data | |
| High Speed & Accurate Simulator for Robot Manipulation | Jan. 2020 - Dec. 2021 |
| <ul style="list-style-type: none">• Ministry of Trade, Industry and Energy (MOTIE)• Developed contact solver and sim-to-real framework of deformable object manipulation | |
| Development of Remote Control Technology for Nuclear Power Plant Maintenance | Jan. 2019 - Dec. 2019 |
| <ul style="list-style-type: none">• Ministry of Trade, Industry and Energy (MOTIE)• Implemented on-board state estimation module for a dual-arm robot working at heights | |

ACTIVITIES

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|---|-----------|
| Consumer Electronics Show (CES) Las Vegas, USA | Jan. 2022 |
| <ul style="list-style-type: none">• Developed and exhibited a virtual environment platform integrated with haptic glove and physics simulation (Link) | |

Academic Reviewer

- T-RO, IJRR, RSS, ICRA, IROS, etc.

Teaching Assistant

- Control System 1 (M2794.005300)
- Mechanical System Modeling and Control (M2794.013500)

Spring 2021

Spring 2020

SKILLS

Programming

C/C++, Python, MATLAB

Tools

Simulation(MuJoCo, Bullet, Isaac Sim, Newton), Robotics(ROS, Drake), Learning(PyTorch, Tensorflow), Warp, OpenGL, Solidworks, LaTeX

Robots

Franka Panda, KUKA iiwa, FRIDAY