

Dongwon Son

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EDUCATION

- **Seoul National University** Seoul, Korea
Bachelor - Mechanical Engineering *March 2010 - Feb 2014*
- **Seoul National University** Seoul, Korea
Master - Mechanical Engineering - Advisor: Dongjun Lee *March 2018 - Feb 2020*
Thesis: Multi-Contact Simulator and Reinforcement Learning for Screw Tightening Tasks
- **Korea Advanced Institute of Science and Technology (KAIST)** Seoul, Korea
PhD student - AI Graduate School - Advisor: Beomjoon Kim *Sep 2022 - Present*

SKILLS SUMMARY

- **Languages:** Python, C++, MATLAB
- **Frameworks:** TensorFlow, Keras, Jax, ROS, OpenGL, Pybullet, Open3D, OMPL, FCL
- **Tools:** SolidWorks, EasyEDA

EXPERIENCE

- **Samsung/Hanwha Techwin** Changwon, Korea
QA Engineer - Gas Turbine Engine Division *May 2014 - Sep 2017*
- **Samsung Research** Seoul, Korea
AI Researcher - AI Methods Team *Feb 2020 - June 2022*
 - **Data-driven Grasping:** Develop algorithm for grasping in a heavily cluttered environment.
 - **Sim-to-real Transfer:** Reduce sim-to-real gap through robot control and domain randomization.
 - **Planning:** Apply AlphaGo Zero to arrangement task.
 - **Data Efficient Reinforcement Learning Algorithm:** Develop data efficient RL algorithm for vision-based object manipulation.

PROJECTS

- **Manipulator Identification:** identification of physics parameters for Franka Emika Panda
- **Manipulator Controller Design:** impedance controller, admittance controller, compliance controller
- **Motor Driver Design And FOC Control:** PCB design, MCU programming, anticogging, FOC control

PUBLICATIONS

- **Data-driven Contact Clustering for Robot Simulation:** Myungsin Kim, Jaemin Yoon, [Dongwon Son](#), and Dongjun Lee. ICRA. 2019. paper
- **Learnable Environment Model with Data Efficiency for MPC of Assembly Tasks:** [Dongwon Son](#), Hyunsoo Yang, and Dongjun Lee. IROS Workshop LRPC. 2019. video paper
- **Sim-to-Real Transfer of Bolting Tasks with Tight Tolerance:** [Dongwon Son](#), Hyunsoo Yang, and Dongjun Lee. IROS. 2020. video paper
- **Reinforcement Learning for Vision-based Object Manipulation with Non-parametric Policy and Action Primitives:** [Dongwon Son](#), Myungsin Kim, Jaechol Sim, and Wonsik Shin. IROS. 2021. video paper
- **Grasping as Inference: Reactive Grasping in Heavily Cluttered Environment:** [Dongwon Son](#). RA-L. 2022. video paper
- **Interaction-Based Grasp Metric for Improving Grasp Prediction Performance (under review):** [Dongwon Son](#), Jaecheol Sim, Wonsik Shin, Jeongmin Choi, and Myungsin Kim. RA-L. 2022. paper
- **Efficient Parallel Rigid Body Simulation using Local Object Crop Collision Network (under review):** [Dongwon Son](#), and Beomjoon Kim. ICRA. 2023. paper

RESEARCH INTERESTS

- Manipulation (object manipulation, grasping, vision-based assembly, long-horizon manipulation)
- Computationally efficient simulator (physics engine, rendering)
- Sim-to-real transfer
- Structured network design for manipulation
- Composition between model-based approaches and data-driven methods
- Open-source cost efficient manipulator design