Dongwon Son

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Education

- **Seoul National University** — Seoul, Korea
  B.S. in Mechanical Engineering — *March 2010 - Feb 2014*

- **Seoul National University** — Seoul, Korea
  M.S. in 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
  Ph.D. Student - AI Graduate School - HuGe Lab - Advisor: Beomjoon Kim — *Sep 2022 - Present*

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*

  - **Robot Learning**: Developed robot learning algorithms for vision-based manipulation, including cluttered-scene grasping, sim-to-real transfer, planning, and data-efficient reinforcement learning.

- **Allen Institute for AI (Ai2)** — Seattle, WA
  Research Intern, Robotics Group — *Oct 2025 - June 2026*

  - **Torque Adaptation**: Worked on a torque adaptation module to reduce the sim-to-real gap under the mentorship of Dieter Fox.

Publications

- **NeuralSVCD for Efficient Swept Volume Collision Detection**: Dongwon Son, Hojin Jung, and Beomjoon Kim. CoRL. 2025. site
- **DEF-oriCORN: efficient 3D scene understanding for robust language-directed pick-and-place**: Dongwon Son, Sanghyeon Son, Jaehyung Kim, Hojin Jung, and Beomjoon Kim. under review. 2025. site
- **An Intuitive Multi-Frequency Feature Representation for SO(3)-Equivariant Networks**: Dongwon Son, Jaehyung Kim, Sanghyeon Son, and Beomjoon Kim. ICLR. 2024. paper site
- **Preference learning for guiding the tree search in continuous POMDPs**: Jiyong Ahn, Sanghyeon Son, Dongryung Lee, Jisu Han, Dongwon Son, and Beomjoon Kim. CoRL. 2023. video paper site
- **Local Object Crop Collision Network for Efficient Simulation of Non-Convex Objects in GPU-based Simulators**: Dongwon Son, and Beomjoon Kim. R:SS. 2023. video paper site
- **Grasping as Inference: Reactive Grasping in Heavily Cluttered Environment**: Dongwon Son. RA-L. 2022. 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
- **Sim-to-Real Transfer of Bolting Tasks with Tight Tolerance**: Dongwon Son, Hyunsoo Yang, and Dongjun Lee. IROS. 2020. video 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
- **Data-driven Contact Clustering for Robot Simulation**: Myungsin Kim, Jaemin Yoon, Dongwon Son, and Dongjun Lee. ICRA. 2019. paper

Skills Summary

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

Engineering Projects

- **Manipulator Identification**: Identified physics parameters for Franka Emika Panda.
- **Manipulator Controller Design**: Implemented impedance, admittance, and compliance controllers.
- **Motor Driver Design and FOC Control**: Built PCB and MCU control stack with anticogging and FOC control.

Research Interests

- Robot manipulation, including object manipulation, grasping, vision-based assembly, and long-horizon manipulation
- Computationally efficient simulation, including physics engines, collision detection, and rendering
- Sim-to-real transfer
- Structured network design and shape representation for manipulation and planning
- Open-source, cost-efficient manipulator design