Aaron Kim

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Education

The University of Texas at Austin (*Integrated BSME/MSE Program*) Aug 2020 – May 2026

Master of Science, Mechanical Engineering (*NSF Research Traineeship Recipient*) GPA: 3.7/4.0

Bachelor of Science, Mechanical Engineering GPA: 3.6/4.0

Experience

Human Centered Robotics Lab, The University of Texas at Austin Aug 2024 – Present

Graduate Student Fellow

PLATO Hand (1st Generation)

- Designed and manufactured a three-fingered robotic hand using a 5-bar linkage architecture inspired by human musculoskeletal anatomy with sensorized fingernails, achieving over 95% coverage of the Cutkosky Grasp Taxonomy.
- Developed control and UI software for intuitive teleoperation, including pre-defined position saving, minimum-jerk trajectory planning, real-time data collection, and robot visualization via Foxglove Studio.
- Applied reinforcement learning (RL) in NVIDIA Isaac Sim to optimize grasping policies for complex object manipulation, including fingernail-based grasping of flat objects.

ARISTO Hand (2nd Generation)

- Led development of a tendon-driven robotic hand featuring double-parallel tendon routing and decoupled joints for human-like dexterity.
- Integrated tactile, force-torque, proprioceptive, and RGB-D sensors to achieve human-like sensing while improving manufacturability, range of motion (+50%), and back-drivability.
- Utilized imitation learning to validate the role of multimodal sensing in data collection and deployed learned policies for complex manipulation tasks.
- Developed CAN bus communication and embedded firmware for reliable actuator control and high-rate sensor streaming.

Sony Corporation – Fundamental Robotics Lab, Tokyo, Japan May 2024 – Aug 2024

Research Intern

- Designed a multi-finger robotic hand meeting 0.634 N fingertip force and torque specifications using harmonic gearboxes and compact direct-drive motors.
- Increased torque from 0.03 Nm to 0.9 Nm with a 30:1 reduction gearbox; designed and built a custom test bench to verify performance, enabling dexterous manipulation of small objects (e.g., Jenga blocks).

Human Centered Robotics Lab, The University of Texas at Austin Jan 2023 – May 2024

Undergraduate Researcher

- **Draco 3 Humanoid Robot:** Designed and validated force-torque sensor mounts through finite element analysis (FEA) for structural integrity and safety compliance; maintained and enhanced humanoid hardware systems.
- **Bumpy Bot:** Developed ROS-based navigation for an omni-directional mobile robot, integrating LiDAR, SLAM, and velocity filtering for smooth trajectory tracking and autonomous operation.

Publications

Dong Ho Kang, **Aaron Kim**, and Luis Sentis. "PLATO Hand: Dexterous Robotic Hand with Fingernails for Versatile Force Interaction," *IEEE Robotics and Automation Letters*, under review, 2025.

Skills

Design/Fabrication: SolidWorks, Onshape, Inventor, 3D Printing, Machining, GD&T, Mechanism Design, Tolerance Analysis

Modeling/Control/Embedded: ROS, C++, Python, MATLAB, FEA, Kinematics, Trajectory Optimization, CAN Bus, RL (Isaac Lab), Sim-to-Real, Arduino, Sensors, Signal Processing, Motor Control