

# Juncheng Li

*Ph.D.*

Department of Mechanical Engineering, Purdue University

☎ 6315385788 | ✉ ljc312463566@gmail.com | 🏠 www.juncheng-li.com | in Juncheng (Jason) Li

## EDUCATION

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**Purdue University, West Lafayette, IN** January 2020 - May 2024  
Ph.D. in Mechanical Engineering  
Advisor: David J. Cappelleri

**University of Pennsylvania, Philadelphia, PA** August 2018 - December 2019  
M.S.E. in Robotics (Computer and Information Science)  
Advisor: Mark Yim

**Stony Brook University, Stony Brook, NY** January 2015 - May 2018  
B.E. in Mechanical Engineering  
Advisor: Benjamin Lawler

## PROFESSIONAL EXPERIENCE

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**Amazon Robotics, North Reading, MA** July 2024 - Present  
*Applied Scientist II*

- Manipulation in cluttered environment

**Amazon Robotics, North Reading, MA** May 2023 - August 2023  
*Applied Scientist Internship*

- Led the development of Push and Grasp Synergy for automated item picking in cluttered environments, leveraging point cloud data for precise object manipulation.
- Utilized Isaac Sim simulator to generate large-scale synthetic datasets, enhancing the training and accuracy of object recognition algorithms.
- Implemented heuristic methods to annotate push candidates, streamlining the process of identifying optimal item positioning for efficient grasping.

## ACADEMIC/ TEACHING EXPERIENCE

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**Graduate Teaching Assistant** September 2022 - December 2022  
*ME 263, Purdue University*

- Served as Lab Coordinator, directing labs for ME263: Introduction to Mechanical Engineering Design, Innovation, and Entrepreneurship. Managed lab activities, facilitated student learning, and ensured effective execution of practical sessions.

**Graduate Research Assistant** January 2020 - Present  
*RETHi Institute Funded by NASA, Purdue University*

- Developed a modular end-effector system enabling swift swapping between different end-effectors, enhancing operational flexibility.
- Created large-scale synthetic datasets in a simulation environment for diverse grippers, improving grasping efficiency in cluttered environments.
- Pioneered the use of text prompts for task-specific and object-aware robotic operations, streamlining adaptability in dynamic settings.

**Graduate Researcher** 2018 - 2019  
*GRASP Lab, University of Pennsylvania*

- Produced a flying vehicle capable of maneuvering through and manipulating objects in the interior environment of a cluttered building.
- Worked on the QTR sensor to figure out the displacement of the Spiral Zipper.

**Undergraduate Researcher** 2017 - 2018  
*Independent Research, Stony Brook University*

- Focused on hybrid electric vehicle power-train and control strategy optimization to maximize the synergy with a gasoline HCCI engine.

**Physics Tutor** 2017 - 2018  
*Academic Success and Tutoring Center, Stony Brook University*

- Provided tutoring services in physics, assisting students in understanding core concepts and solving complex problems.

**Undergraduate Researcher** May 2017 - September 2019  
*Academic Success and Tutoring Center, Stony Brook University*

- Designed and controlled a 6-DoF robot manipulator built from Snappy Kit.

## SKILLS

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<b>Programming Languages</b>	Python, C/C++, R-Language, MATLAB
<b>Simulators</b>	Isaac Sim, Pybullet, Gazebo
<b>Software &amp; Tools</b>	HTML, LaTeX, SolidWorks, AutoCAD, LabVIEW, PTC CREO Arduino, SIMULINK, ROS

## RESEARCH AREAS

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**Grasping Policy:** grasping policy for parallel jaw gripper, soft gripper, and suction cup gripper in cluttered environment

**Modular End-Effector System:** a robot agnostic system compatible with customized sensors and end-effectors

**Computer Vision:** Large language model, visual language model, and object detection.

## SELECTED PUBLICATIONS

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### Journal Articles

- J1 **J. Li**, D. Cappelleri. "Sim-Grasp Learning 6-DOF Grasp Policies for Cluttered Environments Using a Synthetic Benchmark" in *IEEE Robotics and Automation Letters (RA-L)*, <https://arxiv.org/abs/2405.00841>.
- J2 **J. Li**, D. Cappelleri. "Sim-Suction: Learning a Suction Grasp Policy for Cluttered Environments Using a Synthetic Benchmark" in *IEEE Transactions on Robotics (T-RO)*, doi: 10.1109/TRO.2023.3331679.
- J3 A. Chowdhury, **J. Li**, D. Cappelleri. "Neural Network-Based Pose Estimation Approaches for Mobile Manipulation." *ASME Journal of Mechanisms and Robotics (JMR)*, doi: <https://doi.org/10.1115/1.4053927>.

### Conference Proceedings

- C1 **J. Li**, C. Teeple, R. J. Wood and D. J. Cappelleri, "Modular End-Effector System for Autonomous Robotic Maintenance & Repair," 2022 International Conference on Robotics and Automation (ICRA), 2022, pp. 4510-4516, doi: 10.1109/ICRA46639.2022.9812152.

C2 A. Chowdhury, **J. Li**, D. Cappelleri. “Comparison of Neural Network-Based Pose Estimation Approaches for Mobile Manipulation.” *Proceedings of the ASME 2021 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference. Volume 8A: 45th Mechanisms and Robotics Conference (MR)*. Virtual, Online. August 17–19, 2021.  
<https://doi.org/10.1115/DETC2021-69800>

## **SERVICE**

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### **Academic Conference Peer Review**

- IEEE International Conference on Robotics and Automation (ICRA)
- IEEE-RAS International Conference on Soft Robotics (RoboSoft 2023)

### **Academic Journal Peer Review**

- IEEE Transactions on Robotics (T-RO)
- IEEE Robotics and Automation Letters (RA-L)
- IEEE Transactions on Automation Science and Engineering (T-ASE)

## **EXTRACURRICULAR AND PROFESSIONAL AFFILIATIONS**

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Tau Beta Pi Engineering Honor Society

Pi Tau Sigma National Mechanical Engineering Honor Society

Sigma Beta Honor Society

Golden Key international Honor Society

Dean's List