# Sagar Jatin Joshi

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## Education

**University of Southern California,** ***Los Angeles*** **August 2023 – May 2025**
*Masters of Science in Mechanical Engineering* *GPA: 3.73/4.0*

**University of Mumbai,** ***India*** **August 2019 – May 2023**
*Bachelor of Science in Mechanical Engineering* *GPA: 8.7/10.0*

## Technical Skills

**Programming/Robotics**: Python, C++, MATLAB, Java, Kuka Sunrise.OS, ABB RobotStudio, MoveIt2, tf2, Hand-Eye Calibration, realsense2, NVIDIA CuRobo, CuMotion, Isaac ROS
**Software**: IsaacSim, Webots, Pybullet, ANSYS, Fusion 360, SolidWorks, ABAQUS, Simulink, RoboDK
**Manufacturing**: 3D Printing, CNC Machining, Drilling, Grinding, Manual & Automated Assembly, GD&T

## Experience

**GrayMatter Robotics** **August 2025 – Present**
***Robotics Engineer Intern*** *Los Angeles, CA*

- Developing an automated sandblasting pipeline with Fanuc M20iD/25 manipulator, integrating Zivid 2+ R-Series 3D vision for high-fidelity part scanning
- Implemented surface segmentation algorithms leveraging curvature and convexity metrics to identify blast regions across complex freeform geometries
- Designed and optimized tool-path generation for uniform media coverage, coordinating robotic motion with real-time process parameters such as blast pressure and nozzle stand-off

**Realization of RObotic Systems Lab (RROS)** **May 2024 – July 2025**
***Research Assistant*** *Los Angeles, CA*

- Engineered dual-arm coordination on an ABB IRB120 and KUKA iiwa 14, integrating Nvidia cuMotion library and OMPL to achieve high-efficiency motion planning for fast coordinated grasping
- Incorporated multi-view perception using ROS2 + RealSense data streams to capture 6D poses, employing transformer-based behavior cloning for intuitive human-in-the-loop data generation
- Operationalized diffusion-model-based action prediction to handle uncertain object geometry, ensuring robust closed-loop disassembly across varying battery positions and orientations achieving 96% accuracy
- Developed a real-time deployment workflow with data-driven trajectories, leveraging a differentiable paradigm for scalable autonomy and large-model testing in real-world robotic systems
- Implemented a language-conditioned, sub-task-aware diffusion policy for real-world disassembly on the NIST Task Board, improving task-switching latency by 49% and task success rates by 19% over single-task policies.
- Spearheaded a robotic thermal processing system with a UR10, integrating multi-view FLIR Lepton 3.5 to generate 3D thermal point clouds and autonomously identify cold surface regions for targeted heating trajectories
- Architected an Open3D-based interactive segmentation tool enabling user-defined surface selection, bridging human input with automated robotic heating for precise and adaptive thermal control

**Zhao Research Group** **September 2023 – January 2024**
***Research Assistant*** *Los Angeles, CA*

- Engineered a soft stretchable EMG sensor with a micro-needle array in a serpentine pattern for improved muscle readings, optimized for UV resin 3D printing, and enhanced adhesion while maintaining flexibility.

## Publications

- Kang, Jeon Ho, Joshi, Sagar, Huang, Ruopeng, & Gupta, Satyandra K. (2024). "Robotic Compliant Object Prying Using Diffusion Policy Guided by Vision and Force Observations.", IEEE Robotics and Automation Letters.
- Kang, Jeon Ho, Joshi, Sagar, Dhanaraj, Neel, & Gupta, Satyandra K. (2025). "Task-Context-Aware Diffusion Policy with Language Guidance for Multi-task Disassembly." [Accepted CASE 2025]

## Projects

**Modified Robot Gripper for Glass Handling**

- Conceptualized and simulated a robotic system in Webots for handling glass panels, with a custom end-effector ensuring smudge-free transport to an edge handling conveyor

**Senior Brakes Engineer** | *DJS Racing*

- Led and mentored a 12-member team to a national competition, applying DFMA principles to design and manufacture custom components, realizing a 22% weight reduction, improved ergonomics, and a 27% cost reduction
- Conducted research on controlled braking for a Driverless Formula Student car, exploring regenerative braking, coated rotors, and rotor thermal simulations, resulting in informed recommendations across 4 research project