Nikita Sarawgi

(213) 681-5109 | sarawgi@usc.edu | nikitasarawgi.github.io | nikita-sarawgi

Research Interests

I am interested in building robust, reliable, and interpretable robots for real-world manipulation through structured, compositional systems that learn reusable abstractions and skills, compose them for long-horizon tasks, and continually acquire and integrate missing knowledge as they encounter new tasks and environments.

Education

University of Southern California — *Los Angeles, CA*

Master of Science in Computer Science | GPA: 4.0/4.0 — *Jan. 2024 – Dec. 2025*

Manipal Institute of Technology — *Manipal, India*

Bachelor of Technology in Computer Science and Engineering | Minor in Intelligent Systems | GPA: 3.9/4.0 — *Jul. 2016 – Jul. 2020*

Experience

GrayMatter Robotics — *Los Angeles, CA*

Robotics and AI Engineer — *Oct. 2025 – Present*

- Developing an agentic robotic system for autonomous cell commissioning, combining scene representation, active perception, and planning for zero-shot onboarding of new manufacturing parts at customer sites.
- Built next-best-view pipeline for 3D reconstruction, combining world models with Gaussian process trained on real-world data; jointly optimized geometric information gain, sensor reliability, and kinematic preferences, reducing required viewpoints by 60%.
- Constructed a hierarchical 3D scene graph for manufacturing cell using SAM3 and VLM segmentation with task reasoning to establish geometric and semantic relationships for downstream planning.

Realization of Robotics Systems Lab & SLURM Lab, USC — *Los Angeles, CA*

Graduate Research Assistant | Advisors: Dr. Satyandra K. Gupta and Dr. Daniel Seita — *May 2024 – Sep. 2025*

STEP [ICRA 2026]:

- Developed a preference-conditioned multi-objective RL policy for warehouse bin packing with Amazon Robotics to select trade-offs between space efficiency and robot operation time at inference without retraining.
- Trained in simulation and validated on ABB robot; reduced operation time by 44% over baselines while maintaining packing density.

Robotic Insertion [AIAA SciTech 2025]:

- Developed a sim-to-real EfficientNet-CBAM regressor for relative pose estimation of non-convex peg-hole assemblies using synthetic pretraining and real-world fine-tuning; achieved 85% insertion success on a KUKA robot.

Robot-to-Human Handover:

- Explored a safe robot-to-human handover pipeline in ManiSkill simulation, using an Allegro Hand for object reorientation and vision-language models to assess handover readiness.

Microsoft — *Hyderabad, India*

Software Development Engineer II — *Jul. 2020 – Dec. 2023*

- Developed a cross-platform Azure VM extension in Go for Windows and Linux, interfacing with kernel-level telemetry to enable sub-minute change tracking while processing 5,000+ concurrent data items with <5% memory usage.
- Designed backend services for Change Tracking and Inventory handling 1.5M+ machine reports daily, with fault-tolerant data synchronization and load balancing across distributed Azure services.
- Developed a GPT-3.5 copilot for Azure Migrate, integrating predictive cost models with Azure OpenAI, LangChain, and Semantic Kernel to estimate workload migration costs.

Boltzmann Labs — *Bangalore, India*

Research Intern — *Jan. 2020 – Jul. 2020*

- Built and released an open-source Python/PyTorch library unifying drug-target interaction prediction and single-cell RNA-seq analysis, with modules for clustering, imputation, dimensionality reduction, and feature extraction; reached 3,400+ PyPI downloads.

Publications

Incorporating World Models in Decision Making for Next Best View Selection in Active Sensing
Nikita Sarawgi, Omey M. Manyar, Satyandra K. Gupta
Conference on Robot Learning Workshop on "Do Robots Need World Models?", 2026 [paper]

Industrial Autonomy Requires World Models within an Execution Harness
Omey M. Manyar, Sagar Jatin Joshi, Samrudh Moode, **Nikita Sarawgi**, Hantao Ye, Satyandra K. Gupta
Conference on Robot Learning Workshop on "Do Robots Need World Models?", 2026

Preference-Conditioned Reinforcement Learning for Space-Time Efficient Online 3D Bin Packing
Nikita Sarawgi, Omey M. Manyar, Fan Wang, Thinh H. Nguyen, Daniel Seita, Satyandra K. Gupta
IEEE International Conference on Robotics and Automation (ICRA), 2026 [paper]

Autonomous Execution of Insertion Operations in Space Assembly Tasks
Abhay Negi, **Nikita Sarawgi**, Dhanush Penmetsa, Hantao Ye, Ashtin K. Cheng, Satyandra K. Gupta
AIAA SciTech Forum, 2025 [paper]

Honors

- **Microsoft IDC LLM-Hackathon Winner (2023):** Developed *AI-Customer*: copilot simulating customer environments for pre-rollout product testing.
- **Growth Mindset Award, Microsoft (2021 & 2022):** Recognized for mentorship and learning agility.
- **Academic Excellence & Gold Medal:** Ranked 5th in the CS Department in the 4th semester of undergraduate study.
- **Merit cum Means Scholarship:** Ranked 296/130,000 in the entrance exam for Manipal Academy of Higher Education.