# TIANYU LI

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## EDUCATIONAL BACKGROUND

**Nanyang Technological University** **Aug. 2026 - Present**
**Major:** Robotics and Intelligent Systems
**Degree:** Master of Science

**University of Liverpool** **Sep. 2023 - Jun. 2026**
**Major:** Computer Science with Software Development
**Degree:** Bachelor of Science
**GPA:** 75/100 (First Class Honours, Top 10%)

## PUBLICATIONS

***European Conference on Computer Vision (ECCV), 2026 (To appear)***
Hanyi Zhang, Zihong Luo, **Tianyu Li**, Khang Nguyen, Basu Hela, Shreyas Kumar, Ngoc Duy Tran, Feng Dai, Khoa Vo, Ngan Le, Shigeru Chiba, Ravi Prakash, Tung D. Ta, Anh Nguyen, Baoru Huang.
"**Gripper-aware Vision-Language-Action Models**".

***IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2026 (To appear)***
Hanyi Zhang*, Khang Nguyen, Charith Munasinghe, Basu Hela, **Tianyu Li**, Zihong Luo, Hoan Nguyen, Hans Wernher van de Venn, Yalin Zheng, Ravi Prakash, Tung D. Ta, Anh Nguyen, Baoru Huang
"**Beyond Visual Grasping: Benchmarking Complex Grasping from Detection to Execution**"

## RESEARCH EXPERIENCE

**Research Assistant**
**Smart Robotic Lab, University of Liverpool, Supervisor: Prof. Anh Nguyen** **Aug 2025 – June 2026**
**Project: Gripper-aware Vision-Language-Action Models.**A research initiative focusing on enabling robotic arms to perform complex manipulation tasks (e.g., unstacking, edge sliding) via Vision-Language-Action models.

- **Simulation Infrastructure Engineering (NVIDIA Isaac Lab):**
  - Architected high-fidelity simulation environments using **NVIDIA Isaac Lab/Sim**, designing complex interaction scenarios for clutter removal and difficult-to-grasp objects.
  - Implemented a modular configuration system to support a heterogeneous fleet of robotic arms (UR5, UR10, Franka Emika) and diverse end-effectors (2-finger grippers, suction cups, dexterous hands), enabling rapid permutation testing for algorithm validation.
- **Real-world System Integration (Sim-to-Real):**
  - Orchestrated the end-to-end deployment of the physical testbed, successfully integrating **UR5e** collaborative robots with **Robotiq 2F** grippers.
  - Configured a multi-sensor and teleoperation ecosystem, synchronizing **Intel RealSense** depth cameras and **3D SpaceMouse** for precise teleoperation and data recording.
- **Dataset Curation & VLA Optimization:**
  - Spearheaded the data collection pipeline, curating a high-quality multimodal dataset comprising over **5,000 trajectories** across varied configurations and scenarios.
  - Collaborated on the training of the **Vision-Language-Action (VLA)** model, specifically contributing to hyperparameter tuning and validation, which improved the model's generalization in edge-case grasping tasks.

**Project: GCA-Bench — Benchmarking Complex Grasping from Detection to Execution.** Contributed to a team benchmark (to appear at IROS 2026) evaluating robotic grasping across the full detection-to-execution pipeline.

- Implemented the benchmark's **4 scenario categories** (singulated, cluttered, constrained, semantic) and **102 grasping tasks** in simulation, spanning 3 levels of language-instruction complexity (generated via GPT-4o mini) and evaluating grasping as a multi-stage process beyond isolated grasp-pose detection.
- Built GPU-accelerated simulation in **NVIDIA Isaac Lab/Sim** (7-DOF Franka Panda, 4 RGB-D cameras) and curated **2,000 simulation and 800 real-world trajectories** via SpaceMouse teleoperation, with synchronized RGB-D and robot-state logging.
- Benchmarked **9 representative baselines** across detection-based pipelines (**AnyGrasp, GraspMAS, cuRobo**) and

end-to-end VLA models (**OpenVLA, OpenVLA-OFT, π0, π0.5**) under the benchmark's evaluation metrics (**DSR, GSR, TSR, SPL**) and analyzed key failure modes across the perception-to-execution gap.
- Validated **sim-to-real transfer** on a **UR5 + Robotiq 2F-85** platform (RTDE control, RealSense depth sensing), with real-world results closely matching simulation.

## WORK EXPERIENCE

**Robotics R&D Intern** **Jul. 2025 - Sep. 2025**
**Shangji Transformation (Guangzhou) Technology Co., Ltd.**
- **System Architecture & Migration:** Spearheaded the migration of legacy navigation modules to **ROS2 (Humble)**, refactoring codebases into rclcpp with modern **C++17** paradigms (RAII, smart pointers) and standardizing the pipeline via **Docker/Conda** for cross-team reproducibility.
- **Motion Planning Algorithms:** Developed a **MoveIt2-based** surgical manipulation platform, implementing and benchmarking advanced planners (**OMPL, STOMP, CHOMP**) to optimize trajectory smoothness and safety in constrained workspaces.
- **Performance & Reliability:** Engineered fault-injection scenarios (sensor noise, sudden obstacles) and conducted real-time profiling using ros2_tracing; outcomes included a **22% reduction in control-loop latency variance** and a **>90% system recovery rate** under dynamic disruptions.

**Embodied AI Industry Research Intern** **Jul. 2024 - Sep. 2024**
**Hesai Technology Co., Ltd.(**Strategic Planning Dept.)
- **State-of-the-Art Research Review:** Conducted a systematic review of cutting-edge **Embodied AI** algorithms (e.g., **ACT, Mobile ALOHA**), analyzing research outputs from **Top 10 CS-Ranking robotics labs** (including Stanford & Berkeley) to identify viable technical pathways for internal adoption.
- **Strategic Industry Analysis:** Evaluated the full technical stacks (hardware architectures, sensor fusion schemes) of 10 leading humanoid robot companies; synthesized findings into a **strategic feasibility report**, providing key benchmarks for the department's product roadmap.
- **Algorithm Reproduction:** Transitioned to the R&D team to spearhead the **reproduction of Imitation Learning policies** on physical hardware, successfully migrating open-source academic codebases to the company's specific robotic platforms.
- **Sim-to-Real Deployment:** Addressed critical **Sim-to-Real gaps** by optimizing data pipelines and tuning control parameters to handle real-world sensor noise, validating the algorithm's robustness and generalization capabilities in unstructured manipulation tasks.

## AWARDS

**University Academic Excellence Award (Top 5%),** University of Liverpool **2023/2024**

## SKILLS

**Programming & Engineering**
- Languages: C++ (17), Python
- Tools: Git, Docker, Conda, CMake, Linux (Ubuntu)

**Robotics & Embodied AI**
- ROS1/ROS2: rclcpp, ros_control, Nav2, MoveIt2, lifecycle nodes, QoS
- Simulation: NVIDIA Isaac Lab/Sim, Gazebo/Ignition, RViz, URDF/Xacro
- Real-hardware integration: UR5/UR5e, Robotiq grippers, Intel RealSense, SpaceMouse teleoperation, RTDE

**Learning & Perception**
- Deep Learning: PyTorch, TensorFlow, ONNX, OpenVINO (inference optimization)
- VLA / Imitation Learning: OpenVLA, π0/π0.5, trajectory data collection & fine-tuning
- Perception: OpenCV, PCL, camera/LiDAR calibration