XINCHENG HE

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Research Interests

Robot Learning, Physical AI, Agentic Policy, Physical Simulation

Education

Shanghai Jiao Tong University (SJTU), Shanghai, China 2023.09–2027.06
Bachelor of Science in Mathematics, Zhiyuan College

- A+ in *Mathematical Analysis (Honor)*, *Advanced Linear Algebra (Honor)*, *Introduction to Computer Science*, *Numerical Analysis*, and *Calculus on Manifolds*

Publications

1. *RigPI: Dynamic Parameter Identification of Rigid Body via VLM-Seeded Differentiable Simulation* **IROS 2026**
   Xincheng He, Rongrong Zhang, Wei Jiang, Wenqiang Xu
2. *Evaluation of Toothbrush Quality Using AI-based Virtual Tooth Plaque Assessment* **ICCAD 2025**
   Junhao Gu*, **Xincheng He***, Ning Luo, Weiwu Yan, Ziliang Guo, Yu Qiao
   ** Equal contribution.*

Research Experience

Skill2Real 2026.03–Present
Artificial Intelligence & Visual Computing Laboratory, UCLA; Advisors: ***Chenfanfu Jiang, Yin Yang***

- **Project description:** We develop Skill2Real, a general agentic sim-to-real framework that transfers structured skills rather than policy weights. A code agent writes Python programs to call a shared robot API in simulation, learns hierarchical brain and cerebellum skills from rollout feedback, and zero-shot transfers them to real robots; packing serves as the main case study.
- **My work:** I develop the **agent-callable robot API** and **code-agent rollout pipeline**, train hierarchical **cerebellum and brain skills** through **critic-guided skill memory** updates, and implement **zero-shot real deployment** using a shared **sim/real API contract**.

Cloth Folding Policy and VLA Model Training 2025.09–2026.02
SEIEE, SJTU; Advisors: ***Cewu Lu, Wenqiang Xu***

- **Project description:** We develop a cloth-folding policy in simulation for a dual-arm dexterous robot with a mobile base and prepare training data for a VLA model.
- **My work:** I train the cloth-folding policy in **simulation** and prepare the dataset for cloth-folding **VLA** model training.

JGS2 Optimization and Cubature Sampling 2025.05–2025.08
Artificial Intelligence & Visual Computing Laboratory, UCLA; Advisors: ***Chenfanfu Jiang, Yin Yang***

- **Project description:** We extend JGS2, a GPU-parallel elastodynamics solver with near second-order convergence, through modifications centered on cubature sampling for efficient physical simulation.
- **My work:** I reproduce and optimize **JGS2**, focusing on implementing its **cubature sampling** component for efficient subspace integration.

RigPI: Dynamic Parameter Identification via Differentiable Simulation 2024.10–2025.09
SEIEE, SJTU; Advisors: ***Cewu Lu, Wenqiang Xu***

- **Project description:** We develop RigPI, a two-stage real-to-sim-to-real framework that combines VLM semantic priors, force-torque and pose observations, and differentiable simulation to identify inertial and frictional parameters of rigid and articulated objects.
- **My work:** I develop the **VLM-seeded initialization** and constrained gradient-optimization pipeline in **NVIDIA Newton**, integrate real-robot interaction data, and evaluate parameter accuracy, stability, and trajectory reproduction on unconstrained and multi-link objects.

AI-based Virtual Tooth Plaque Assessment 2024.12–2025.07
SEIEE, SJTU; Advisor: ***Yu Qiao***

- **Project description:** We develop an AI-based computer vision pipeline for evaluating toothbrush cleaning performance, combining YOLOv10 tooth-region detection with Otsu threshold segmentation to quantify stain-area changes before and after brushing.
- **My work:** I contribute to implementing the **YOLOv10** detection and **Otsu segmentation** pipeline, processing the collected real-case images, and evaluating detection accuracy, robustness, and toothbrush cleaning performance.

Skills

Simulation & Realism: Isaac Lab, Isaac Gym, Isaac Sim, MuJoCo, NVIDIA Newton, NVIDIA Warp, PyBullet.
Robot Rollouts & Interfaces: ROS1, ROS2, URDF.
Real Hardware: Franka, UR5e, Unitree G1.
Programming & Tools: Python, C++, C#, MATLAB, LaTeX; Git, SSH, CMake, Unity.