# Yongqiang Zhao

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## RESEARCH STATEMENT

My research focuses on machine perception for robot interaction, especially visual-tactile perception for dexterous manipulation. So far, I have developed tactile simulation, sim-to-real transfer, and visual-tactile imitation learning methods for assembly, deformable-object tracing, and laboratory manipulation. Over the next few years, I aim to connect robot interaction simulation, tactile system design, and scalable learning algorithms to build general visual-tactile perception models for reliable sim-to-real robot manipulation.

## EDUCATION

### King's College London — *London, UK*

*PhD, Department of Engineering* — Oct. 2024 - Present

- **Supervisor:** Prof. Shan Luo
- **Research Interests:** Dexterous Manipulation, Tactile Simulation, Multimodal Learning

### Southeast University (985 / Double First-Class University) — *Nanjing, China*

*MSc, Control Science and Engineering* — Sep. 2021 - Jun. 2024

- **Supervisor:** Prof. Kun Qian
- **Research Interests:** Robotic Manipulation, Tactile Simulation, Robot Learning
- **MSc Project:** Learning of Robot Manipulation Skills Based on Vision and Tactile sensing in Contact-rich Environments
- **Modules:** Matrix Theory in Engineering (97/100), Numerical Analysis (93/100), Intelligent Robot (90/100), etc.

### Southeast University (985 / Double First-Class University) — *Nanjing, China*

*Bachelor of Engineering, Robot Engineering* — Sep. 2017 - Jun. 2021

- **GPA:** 3.86/4.00, **Ranking:** 13/156
- **Final Year Project:** Depth Completion and Object 6D Pose Estimation Using RGB-D Images
- **Modules:** Analytic Geometry (97/100), Digital & Logic Design (98/100), Robot Software Engineering (94/100), etc.

## SELECTED PUBLICATIONS

[1] **Zhao, Y.**, Zhang, X., Chen, Z., Leonetti, M., Papastavridis, E. S., & Luo, S. **Visual-Tactile Peg-in-Hole Assembly Learning from Peg-out-of-Hole Disassembly.** *IEEE Robotics and Automation Letters*, accepted, 2026. [project]

[2] **Zhao, Y.**, Luo, H., Wang, Y., Papastavridis, E. S., Demiris, Y., & Luo, S. **ViTac-Tracing: Visual-Tactile Imitation Learning of Deformable Object Tracing.** *IEEE International Conference on Robotics and Automation (ICRA)*, accepted, 2026. [project]

[3] **Zhao, Y.**, Qian, K., Duan, B., & Luo, S. **FOTS: A Fast Optical Tactile Simulator for Sim2Real Learning of Tactile-Motor Robot Manipulation Skills.** *IEEE Robotics and Automation Letters*, 2024. [paper] [code] [project]

[4] **Zhao, Y.**, Jing, X., Qian, K., Gomes, D. F., & Luo, S. **Skill Generalization of Tubular Object Manipulation with Tactile Sensing and Sim2Real Learning.** *Robotics and Autonomous Systems*, 2023. [paper]

## PROJECTS

### Tactile Foundation Models for Robot Manipulation — *Dec. 2025 - Present*

- Ongoing collaboration with Huawei Noah's Ark Lab on foundation-model-style tactile representations for contact-rich robot manipulation.
- Lead learning-method design and experimental validation for scalable pretraining objectives connecting tactile sensing, robot state, and visual observations.

### Visual-Tactile Imitation Learning of Deformable Object Manipulation

*Mar. 2025 - Sep. 2025*

- Visiting researcher at the Personal Robotics Laboratory, Imperial College London, collaborating with Dr. Haining Luo, Prof. Yiannis Demiris, and Dr. Emmanuel Papastavridis (Senior Lecturer at King's and my second supervisor) on visual-tactile imitation learning for deformable-object tracing.
- Constructed a visual-tactile teleoperation system for ABB YuMi and introduced local/global task losses for robust tracing policies.
- Resulted in an accepted ICRA 2026 paper with 80%/65% success on seen/unseen objects, strengthening King's–Imperial collaboration.

### Tactile Simulation and Sim-to-Real Skill Learning

*Jan. 2024 - Mar. 2026*

- Propose a fast simulation algorithm for vision-based tactile sensors through learned optical rendering and efficient marker-motion approximation.
- Develop a visual-tactile simulation suite in MuJoCo and support sim-to-real policy learning via teacher-student training, domain randomization, and tactile image transfer.
- Led method design in *FOTS*, achieving 28.6/326.1 fps optical/marker simulation on CPU, with follow-on applications in cable-following, peg-in-hole, and door-opening; subsequently taken up by TU Darmstadt in TacEx and by Amazon Industrial Robotics / University of Michigan in HydroShear.

## SELECTED AWARDS

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| 2022-2023 | National Scholarship (top 1% of 600 students) |
| 2021-2022 | First-class Academic Graduate Scholarship (top 10% of 200 students) |
| 2021-2022 | Merit Student of Southeast University |
| 2018-2019 | National Endeavor Scholarship (top 3% of 600 students) |

## TEACHING

### The Third London Summer School in Robotics and AI

*Organizer* Summer, 2025

- Leading developer and organizer of the world's first visual-tactile grasping mini-hackathon using LeRobot SO-ARM101.
- Reached 50+ participants from the UK, Italy, and Asia across high-school, UG/PGT, and software-professional backgrounds.

## PROFESSIONAL SERVICE & ACTIVITIES

### IEEE Robotics and Automation Letters (RA-L), ICRA 2024/2026, IROS 2024

*Reviewer* 2024 - Present

- Reviewed papers in tactile perception, robot learning, and manipulation for major robotics venues.

### ByteDance AI Lab; invited demonstrations for Meta Reality Labs and UK Manipulation Workshop

*Research & Industry Engagement* 2024 - 2025

- Designed a general-purpose vision-based tactile sensor and presented visual-tactile manipulation systems to industrial research teams.

## SKILLS

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| **Programming** | Python, PyTorch, ROS, C/C++, Git |
| **Professional Softwares** | MuJoCo, Isaac Sim, SolidWorks, MeshLab |
| **Clipping & Typesetting** | Markdown, Office, LaTeX, Premiere |
| **Languages** | Chinese (Native), English (IELTS 7.0: L7.0, R7.5, W7.0, S6.0) |