

# HANG YUAN

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Google Scholar: <https://scholar.google.com/citations?hl=zh-CN&user=xaBXiK8AAAAJ>

## EDUCATION

**Xi'an Jiaotong-Liverpool University (XJTLU), Suzhou, China | B.Eng.** **2020-Current**  
Year 4 | Major in Mechatronics and Robotics Systems

- Major GPA: 3.52/4.00      Cumulative GPA: 3.32/4.00 (Top 15% ranking)      GRE General Test: 327+4.5
- *Outstanding Student (School-wide top 5%), XJTLU* 2021-2022
- *Excellent Student Cadre (University-wide top 0.1%), Jiangsu Province, China* 2022-2023
- *Entrepreneurship Star (University-wide top 1%), XJTLU* 2021-2022 & 2022-2023

## SELECTED PUBLICATIONS

### **Journal:**

- [1] **Yuan, H.**, Yuan, W., Duan, S. *et al.* (2023) Microfluidic-Assisted *Caenorhabditis elegans* Sorting: Current Status and Future Prospects. *Cyborg and Bionic Systems*, 4, 0011. <https://spj.science.org/doi/10.34133/cbsystems.0011>.
- [2] Zhang, J.<sup>†</sup>, Liu, S.<sup>†</sup>, **Yuan, H.**<sup>†</sup> *et al.* (2023) Deep Learning for Microfluidic-Assisted *Caenorhabditis elegans* Multi-Parameter Identification Using YOLOv7. *Micromachines*, 14, 1339. <https://doi.org/10.3390/mi14071339>.
- [3] Yuan, W., **Yuan, H.**, Jiao, K. *et al.* (2023) Facile Microembossing Process for Microchannel Fabrication for Nanocellulose-Paper-Based Microfluidics. *ACS Applied Materials & Interfaces*, 15(5), 6420-6430. <https://pubs.acs.org/doi/10.1021/acsami.2c19354>.
- [4] Yuan, W., **Yuan, H.**, Duan, S. *et al.* (2023) Microembossing: A Convenient Process for Fabricating Microchannels on Nanocellulose Paper-Based Microfluidics. *Journal of Visualized Experiments*, e65965. [doi: 10.3791/65965](https://doi.org/10.3791/65965). [Accept]

### **Conference:**

- [5] **Yuan H.**, Yong, R., Liu, S. *et al.* (2023) A Centrifugation-Assisted Lateral Flow Assay Platform for Bioassay Sensitivity and Visualization Enhancement. *45<sup>th</sup> Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC'23)*. [Poster]
- [6] **Yuan H.**, Zhang W. (2019) A Novel Hedgehog-Inspired Pin-Array Robot Hand with Multiple Magnetic Pins for Adaptive Grasping. In: Yu H. *et al.* (eds.) *12<sup>th</sup> International Conference on Intelligent Robotics and Applications (ICIRA), Proceedings* 5(12), 684-695. [https://doi.org/10.1007/978-3-030-27541-9\\_56](https://doi.org/10.1007/978-3-030-27541-9_56).
- [7] Yuan, W., **Yuan H.**, Duan, S. *et al.* (2023) Highly-integrated SERS-Based Immunoassay NanoPADs for Early Diagnosis of Alzheimer's Disease. *45<sup>th</sup> Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC'23)*. [Poster]
- [8] Liu, S., Li, Y., **Yuan, H.** *et al.* (2023) A Bio-inspired Lateral Flow Assay for Improving the Sensitivity of Low Volume Samples. *19<sup>th</sup> International Meeting on Chemical Sensors (IMCS 2023)*. [Oral presentation]
- [9] Duan, S., Cai, T., Liu, F., **Yuan, H.** *et al.* (2023) An Offline Deep Learning-Assisted Automated Paper-Based Microfluidic Platform. *27<sup>th</sup> International Conference on Miniaturized Systems for Chemistry and Life Sciences ( $\mu$ TAS 2023)*. [Poster]

## GRANTED PATENTS

- [1] **Yuan H.** A Hedgehog-Inspired Magnetic-Driven Self-Adaptive Pin-Array Robot Hand, CN109397278B[P], 2023.
- [2] **Yuan H.**, Zhang W. A Cluster-Tube Self-Adaptive Robot Hand with Controllable Force for Rapid Grasping, CN209533441U[P], 2019.
- [3] **Yuan H.** A Hedgehog-Inspired Magnetic-Driven Self-Adaptive Pin-Array Robot Hand, CN209190774U[P], 2019.
- [4] **Yuan H.** A Parallel and Magnetic-Driven Robot Hand with Linkage Mechanisms, CN209453584U[P], 2019.

## RESEARCH EXPERIENCES

**Centrifugation-Assisted Lateral Flow Assay (CLFA) Platform | Research Leader** **01.2022-Current**  
XJTLU Intelligent Microsystems Laboratory *Supervisor: Pengfei Song*

- Addressed the limited sensitivity and uncontrollable incubation time of traditional LFA.
- Developed a CLFA platform that offers adjustable rotation speeds and enables smartphone-based quantitative bioassay detection, displaying results on the custom-designed UI and mobile application.
- Developed a bio-inspired microfluidic channel to enhance the sensitivity of LFA in bioassays.
- Outcomes: three international conference papers (Publications [5, 8, 9]).

**Microfluidic-Assisted *Caenorhabditis elegans* (*C. elegans*) Sorting | Research Leader** **07.2022-06.2023**  
XJTLU Intelligent Microsystems Laboratory *Supervisor: Pengfei Song*

- Accepted as a cover paper, which provided a comprehensive review of the up-to-date microfluidic-assisted *C. elegans* sorting developments, and featured by the renowned organizations *AAAS & EurekAlert!*.
- Developed a deep learning model using YOLOv7 to automatically detect and recognize *C. elegans* in microfluidic chips, enabling efficient identification and measurement of multiple phenotypes (e.g., size and movement speed).
- Outcomes: two journal papers (Publications [1, 2]).

**Nanocellulose-Paper-Based Microfluidic Platform | Assistant Research Leader** **07.2022-Current**  
XJTLU Intelligent Microsystems Laboratory *Supervisor: Xinyu Liu & Pengfei Song*

- Developed a facile microembossing process using plastic micro-molds to efficiently fabricate microchannels on nanocellulose paper (nanopaper), optimizing the pattern parameters and saving time.
- Developed fundamental microfluidic devices and functional nanopaper-based analytical devices (NanoPADs).
- Detected untreated glial fibrillary acidic protein (GFAP) in human plasma without pretreatment using SERS on NanoPADs, enabling highly sensitive early screening of Alzheimer's disease.
- Outcomes: two journal papers and one international conference paper (Publications [3, 4, 7]).

**Self-Adaptive Robot Hands | Visiting Student** **01.2018-08.2019**  
Key Laboratory for Advanced Materials Processing Technology of Tsinghua University *Supervisor: Wenzeng Zhang*

- Developed a hedgehog-inspired pin-array robot hand with multiple magnetic pins for adaptive grasping.
- Outcomes: four granted patents, and one international conference paper (Publication [6]).

## TEACHING ACTIVITIES

*Student lecturer, XJTLU Optional Course* **03.2021-03.2022**  
• Delivered lectures for the optional “Unlocking Robot Hands” course on mechanical design and robot hands.

*Student Mentor, XJTLU-Affiliated school* **09.2021-08.2022**  
• Taught extracurricular courses to high school students, including robotics, 3D printing, tea culture, and astronomy.

## SELECTED AWARDS:

- Two 1<sup>st</sup> Prize of 21<sup>st</sup> National University Robot Competition (RoboMaster Championship) 2022-2023
- The 1<sup>st</sup> Prize of China Engineering Robotics Competition and International Open Championship 2021-2022

## SKILLS

### **Computer Skills & Software:**

- *Programming:* C, Arduino, MATLAB
- *CAD/CAE:* SolidWorks, AutoCAD, ANSYS (workbench), Rhino
- *Graphic design:* Adobe Illustrator, Adobe Premiere, Adobe Photoshop, KeyShot, Origin

**Language:** Mandarin (Native), English (English-only instruction)