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: 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.[†], Liu, S.[†], **Yuan, H.**[†] *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. [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. 45th *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.) *12th International Conference on Intelligent Robotics and Applications (ICIRA)*, *Proceedings 5*(12), 684-695. 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. 45th *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. *19th 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. *27th International Conference on Miniaturized Systems for Chemistry and Life Sciences (μTAS 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^{st} Prize of 21^{st} National University Robot Competition (RoboMaster Championship) 2022-2023
- The 1^{st} 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)