HANG YUAN

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EDUCATION

Xi'an Jiaotong-Liverpool University (XJTLU) Suzhou, China
Bachelor of Engineering in Mechatronics and Robotic Systems *Expected: June 2024*
University of Liverpool (UoL) Liverpool, United Kingdom
Bachelor of Engineering in Mechatronics and Robotic Systems *Expected: June 2024*

- Weighted Average Mark: 66/100 (British marking criteria)
- TOEFL iBT Test: 100/120; Duolingo English Test: 140/160; GRE General Test: 327 + 4.5

PUBLICATIONS

Peer-Reviewed Journal Papers:

1. **Yuan H.**, Yuan W. *et al*. Microfluidic-Assisted *Caenorhabditis elegans* Sorting: Current Status and Future Prospects. *Cyborg and Bionic Systems, 4,* 0011, Apr. 2023. [Cover paper]
2. Zhang J.†, Liu S.†, **Yuan H.**† *et al*. Deep Learning for Microfluidic-Assisted *Caenorhabditis elegans* Multi-Parameter Identification Using YOLOv7. *Micromachines, 14,* 1339, Jun. 2023. † denotes equal contributions.
3. Yuan W., **Yuan H.** *et al*. Facile Microembossing Process for Microchannel Fabrication for Nanocellulose-Paper-Based Microfluidics. *ACS Applied Materials & Interfaces, 15*(5), 6420-6430, Jan. 2023.
4. Yuan W., **Yuan H.** *et al*. Microembossing: A Convenient Process for Fabricating Microchannels on Nanocellulose Paper-Based Microfluidics. *Journal of Visualized Experiments, 200*, e65965, Oct. 2023.

Peer-Reviewed Conference Papers:

1. **Yuan H.**, Zhang W. A Novel Hedgehog-Inspired Pin-Array Robot Hand with Multiple Magnetic Pins for Adaptive Grasping. *12th International Conference on Intelligent Robotics and Applications (ICIRA)*, Shenyang, China, Aug. 8-11 2019.

CONFERENCE PARTICIPATION

1. **Yuan H.** *et al*. 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 2023),* Sydney, Australia, Jul. 24-27, 2023. [Poster]
2. Yuan W., **Yuan H.** *et al*. 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 2023),* Sydney, Australia, Jul. 24-27, 2023. [Poster]
3. Liu S., Li Y., **Yuan H.** *et al*. A Bio-inspired Lateral Flow Assay for Improving the Sensitivity of Low Volume Samples. *19th International Meeting on Chemical Sensors (IMCS 2023),* Changchun, China, Aug. 4-8, 2023. [Oral]

GRANTED PATENTS

1. **Yuan H.** A Parallel and Magnetic-Driven Robot Hand with Linkage Mechanisms, CN109531610B[P], 2023. [Invention patent] (Granted pending publication)
2. **Yuan H.** A Hedgehog-Inspired Magnetic-Driven Self-Adaptive Pin-Array Robot Hand, CN109397278B[P], 2023. [Invention patent]
3. **Yuan H.**, Zhang W. A Cluster-Tube Self-Adaptive Robot Hand with Controllable Force for Rapid Grasping, CN209533441U[P], 2019. [Utility model patent]
4. **Yuan H.** A Hedgehog-Inspired Magnetic-Driven Self-Adaptive Pin-Array Robot Hand, CN209190774U[P], 2019. [Utility model patent]
5. **Yuan H.** A Parallel and Magnetic-Driven Robot Hand with Linkage Mechanisms, CN209453584U[P], 2019. [Utility model patent]

RESEARCH EXPERIENCE

Research Leader, XJTLU *Supervisor: Dr. Pengfei Song, XJTLU*
Centrifugation-Assisted Lateral Flow Assay (CLFA) Platform January 2022 - Present

- Developed a CLFA platform with adjustable rotation speeds, enabling smartphone-based quantitative bioassay detection and overcoming limitations of traditional LFAs.
- Developed a bio-inspired microfluidic channel to enhance the bioassay sensitivity of LFAs.

Research Leader, XJTLU *Supervisor: Dr. Pengfei Song, XJTLU*
Microfluidic-Assisted *Caenorhabditis elegans* (*C. elegans*) Sorting July 2022 - June 2023

- Provided a review about *C. elegans* sorting featured by organizations *AAAS & EurekAlert!*.
- Developed a deep learning model using YOLOv7 to automatically detect and recognize multiple phenotypes of *C. elegans* in microfluidic chips (*e.g.*, size and movement speed).

Research Assistant, XJTLU
Supervisors: Prof. Xinyu Liu, University of Toronto & Dr. Pengfei Song, XJTLU
Nanocellulose Paper (nanopaper)-Based Microfluidic Platform July 2022 - Present

- Developed a facile microembossing process using plastic micro-molds to efficiently fabricate microchannels on nanopaper.
- Detected untreated glial fibrillary acidic protein (GFAP) in human plasma without pretreatment using SERS on functional nanopaper-based analytical devices (NanoPADs), enabling highly sensitive early screening of Alzheimer's disease.

Visiting Student, Tsinghua University *Supervisor: Dr. Wenzeng Zhang, Tsinghua University*
Self-Adaptive Robot Hands January 2018 - August 2019

- Developed a hedgehog-inspired pin-array robot hand with multiple magnetic pins for adaptive grasping, efficiently adjusting to diverse object shapes and sizes.

TEACHING EXPERIENCE

Student lecturer, XJTLU Optional Course March 2021 - March 2022

- Lectured undergraduate class of about 50 students; demonstrated robot hand techniques.

Student lecturer, XJTLU-Affiliated School September 2021 - August 2022

- Lectured high school student class of about 50 students; provided extracurricular courses, including robotics, 3D printing, tea culture, and astronomy.

SELECTED HONORS & AWARDS

- Excellent Student Cadre (University-wide top 0.1%), Jiangsu Province, China 2022
- Outstanding Student (School-wide top 5%), XJTLU 2022 & 2023
- Two 1^{st} Prizes of 2022 RoboMaster University Championship in the 21^{st} National University Robot Competition *National Achievement & Robot Combat Award* 2022-2023
- The 1^{st} Prize of RoboWork China Engineering Robotics Competition 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

Experimental Skills:

- *Fabrication*: 3D printing, wax printing, laser cutting
- *Immunoassays*: Enzyme-linked immunosorbent assay (ELISA), Lateral flow assay (LFA)
- *Chemical synthesis*: AuNPs, AgNPs, Bottlebrush elastomers
- *Characterization*: UV-vis, FTIR, SEM, SERS, XRD

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

REFERENCES

Pengfei Song, Ph. D., Assistant Professor Pengfei.Song@xjtlu.edu.cn
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Xinyu Liu, Ph.D., Professor xyliu@mie.utoronto.ca
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Wenzeng Zhang, Ph.D., Associate Professor wenzeng@tsinghua.edu.cn
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