

# HANG YUAN

111 Ren'ai Road, Suzhou Industrial Park, Suzhou, Jiangsu, China, 215123

Web: <https://enderhangyuan.github.io/>

Tel.: (+86) 15824969252 • Email: [Hang.Yuan20@student.xjtlu.edu.cn](mailto:Hang.Yuan20@student.xjtlu.edu.cn)

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

## 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. DOI: [10.34133/cbsystems.0011](https://doi.org/10.34133/cbsystems.0011). [Cover paper]
2. Zhang J.<sup>†</sup>, Liu S.<sup>†</sup>, **Yuan H.**<sup>†</sup> *et al.* Deep Learning for Microfluidic-Assisted *Caenorhabditis elegans* Multi-Parameter Identification Using YOLOv7. *Micromachines*, 14, 1339, Jun. 2023. DOI: [10.3390/mi14071339](https://doi.org/10.3390/mi14071339). <sup>†</sup> 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. DOI: [10.1021/acsami.2c19354](https://doi.org/10.1021/acsami.2c19354).
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. DOI: [10.3791/65965](https://doi.org/10.3791/65965).
5. Zhu J., **Yuan H.** *et al.* The Impact of Short Videos on Student Performance in an Online-Flipped College Engineering Course. *Humanities and Social Sciences Communications*, 9, 327, Sept. 2022. DOI: [10.1057/s41599-022-01355-6](https://doi.org/10.1057/s41599-022-01355-6).
6. Song P., Ou P., Wang Y., **Yuan H.** *et al.* An Ultrasensitive FET Biosensor Based on Vertically Aligned MoS<sub>2</sub> Nanolayers with Abundant Surface Active Sites. *Analytica Chimica Acta*, 1252, 341036, Apr. 2023. DOI: [10.1016/j.aca.2023.341036](https://doi.org/10.1016/j.aca.2023.341036).
7. Jiao K., Cao W., Yuan W., **Yuan H.** *et al.* Cellulose Nanostructures as Tunable Substrates for Nanocellulose-Metal Hybrid Flexible Composites. *ChemElectroChem*, Nov. 2023. (Accepted pending publication)

### Peer-Reviewed Conference Papers:

1. **Yuan H.**, Zhang W. A Novel Hedgehog-Inspired Pin-Array Robot Hand with Multiple Magnetic Pins for Adaptive Grasping. *12<sup>th</sup> International Conference on Intelligent Robotics and Applications (ICIRA)*, Shenyang, China, Aug. 8-11 2019. DOI: [10.1007/978-3-030-27541-9\\_56](https://doi.org/10.1007/978-3-030-27541-9_56).
2. Wang L., Zhang Z., Chen M., Xie J., Liu F., **Yuan H.** *et al.* Machine Learning-Based Fatigue

Life Evaluation of the Pump Spindle Assembly with Parametrized Geometry. *ASME 2023 International Mechanical Engineering Congress & Exposition (IMECE)*, New Orleans, USA, Oct. 29-Nov. 2 2023.

## CONFERENCE PARTICIPATION

1. **Yuan H.**, Yong R. *et al.* 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 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. *45<sup>th</sup> 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. *19<sup>th</sup> International Meeting on Chemical Sensors (IMCS 2023)*, Changchun, China, Aug. 4-8, 2023. [Oral]
4. Duan S., Cai T., Liu F., **Yuan H.** *et al.* 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)*, Katowice, Poland, Oct. 15-19, 2023. [Poster]

## GRANTED PATENTS

1. **Yuan H.** A Parallel and Magnetic-Driven Robot Hand with Linkage Mechanisms, CN109531610B[P], 2023. [Invention patent]
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

Suzhou, China

**Centrifugation-Assisted Lateral Flow Assay (CLFA) Platform**

January 2022 - Present

*Supervisor: Dr. Pengfei Song, XJTLU*

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

**Research Leader**, XJTLU

Suzhou, China

**Microfluidic-Assisted *Caenorhabditis elegans* (*C. elegans*) Sorting**

July 2022 - June 2023

*Supervisor: Dr. Pengfei Song, XJTLU*

- Provided a review about *C. elegans* sorting featured by 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).

**Research Assistant, XJTLU**

Suzhou, China

**Nanocellulose Paper (nanopaper)-Based Microfluidic Platform**

July 2022 - Present

*Supervisors: Prof. Xinyu Liu, University of Toronto & Dr. Pengfei Song, XJTLU*

- 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.

**Research Assistant, XJTLU**

Suzhou, China

**Humanoid Robot and Fatigue Analysis**

May 2021 - October 2021

*Supervisors: Dr. Min Chen, XJTLU & Dr. Quan Zhang, XJTLU*

- Developed humanoid robots based on Raspberry Pi, and programmed motion sequences.
- Assisted in analyzing a specific-sized spindle model to predict its fatigue life under various external loading conditions, validating numerical simulations.

**Mechanical Engineer & Investment Manager, XJTLU**

Suzhou, China

**Competitive Combat Robots**

October 2020 - October 2022

*Supervisors: Prof. Cezhou Zhao, XJTLU & Dr. Chun Zhao, XJTLU*

- Designed and fabricated mechanical components for robots, including the launching and mobility mechanisms, using several materials (e.g., carbon fiber, resin, and nylon).
- Authored proposals for companies to support team operations; funded ¥ 60,000.

**Visiting Student, Tsinghua University**

Beijing, China

**Self-Adaptive Robot Hands**

January 2018 - August 2019

*Supervisor: Dr. Wenzeng Zhang, Tsinghua University*

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

## 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)

## 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.

## HONORS

- Excellent Student Cadre (University-wide top 0.1%), Jiangsu Province, China 2022
- Entrepreneurship Star (University-wide top 1%), XJTLU 2022 & 2023
- Outstanding Student (School-wide top 5%), XJTLU 2022 & 2023
- Excellent Student Cadre (University-wide top 1%), XJTLU 2021

## SELECTED AWARDS

- The 1<sup>st</sup> Prize of 2022 RoboMaster University Championship in the 21<sup>st</sup> National University Robot Competition *National Regional* 2022-2023
- The 1<sup>st</sup> Prize of 2022 RoboMaster University Championship in the 21<sup>st</sup> National University Robot Competition *Robot Combat Award* 2022-2023
- The 1<sup>st</sup> Prize of RoboWork China Engineering Robotics Competition 2021-2022

## SERVICE & ACTIVITIES

- **Executive Director**, Yuanhe Technology (Changzhou) Co., Ltd. 2022-Present
- **Academic Buddy**, XJTLU 2021-2022
- **President & Liaison Minister**, XJTLU Sagittarius Astronomy Club 2021-2022
- **Liaison Minister**, XJTLU G-Master Robot Club 2021-2022
- **Vice President**, XJTLU Tea Club 2020-2021