HANG YUAN

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EDUCATION

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

- Weighted Average Mark: Top 15% (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*. A SERS nanocellulose-paper-based analytical device for ultrasensitive detection of Alzheimer's disease. *Analytica Chimica Acta*, *1301*, 342447, May 2024.
4. 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.
5. 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.
6. 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, Sep. 2022.
7. Yuan W.†, Jiao K.†, **Yuan H.** *et al.* MOFs/Heterojunction Structures for Surface-enhanced Raman Scattering with Enhanced Sensitivity and Tailorability. *ACS Applied Materials & Interfaces*, Apr. 2024. [Cover Paper] (Pending publication) † denotes equal contributions.
8. Song P., Ou P., Wang Y., **Yuan H.** *et al*. An Ultrasensitive FET Biosensor Based on Vertically Aligned MoS_2 Nanolayers with Abundant Surface Active Sites. *Analytica Chimica Acta*, *1252*, 341036, Apr. 2023.
9. Wang L., He L., Liu F., **Yuan H.** *et al*. Mechanical Characterization of Multifunctional Metal-Coated Polymer Lattice Structures. *Materials*, *17*(3), 741, Feb. 2024.
10. Jiao K., Cao W., Yuan W., **Yuan H.** *et al*. Cellulose Nanostructures as Tunable Substrates for Nanocellulose-Metal Hybrid Flexible Composites. *ChemPlusChem*, *2024*, e202300704, Feb. 2024.

11. Duan S., Cai T., Liu F., Li Y., **Yuan H.** *et al*. Automatic offline-capable smartphone paper-based microfluidic device for efficient Alzheimer's disease detection. *Analytica Chimica Acta*, Apr. 2024. (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. *12th International Conference on Intelligent Robotics and Applications (ICIRA)*, *5*(12), 684-695, Shenyang, China, Aug. 8-11, 2019.
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)*, *87684*, V011T12A022, New Orleans, USA, Oct. 29-Nov. 2, 2023.

CONFERENCE PARTICIPATION

1. **Yuan H.** *et al*. A Centrifugation-Assisted Lateral Flow Assay Platform for Bioassay Sensitivity and Visualization Enhancement. 4*5th 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. *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]
4. Duan S., Cai T., Liu F., **Yuan H.** *et al*. An Offline Deep Learning-Assisted Automated Paper-Based Microfluidic Platform. *27th International Conference on Miniaturized Systems for Chemistry and Life Sciences (μTAS 2023)*, Katowice, Poland, Oct. 15-19, 2023. [Poster]

GRANTED PATENTS

1. **Yuan H.**, Zhang W. A Cluster-Tube Self-Adaptive Robot Hand with Controllable Force for Rapid Grasping, CN109571539B[P], 2023. [Invention patent]
2. **Yuan H.** A Parallel and Magnetic-Driven Robot Hand with Linkage Mechanisms, CN109531610B[P], 2023. [Invention patent]
3. **Yuan H.** A Hedgehog-Inspired Magnetic-Driven Self-Adaptive Pin-Array Robot Hand, CN109397278B[P], 2023. [Invention patent]
4. **Yuan H.**, Zhang W. A Cluster-Tube Self-Adaptive Robot Hand with Controllable Force for Rapid Grasping, CN209533441U[P], 2019. [Utility model patent]
5. **Yuan H.** A Hedgehog-Inspired Magnetic-Driven Self-Adaptive Pin-Array Robot Hand, CN209190774U[P], 2019. [Utility model patent]
6. **Yuan H.** A Parallel and Magnetic-Driven Robot Hand with Linkage Mechanisms, CN209453584U[P], 2019. [Utility model patent]

RESEARCH EXPERIENCES

Research Leader, XJTLU *Supervisor: Dr. Pengfei Song, XJTLU*

Centrifugation-Assisted Lateral Flow Assay (CLFA) Platform Jan. 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 Jul. 2022 - Jun. 2023
- Provided a review about *C. elegans* sorting featured by organizations *AAAS & EurekAlert!*.
- Developed a deep learning model using YOLOv7 to automatically detect and measure 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 Jul. 2022 - Present
- Developed a facile microembossing process using plastic micro-molds to fabricate microchannels on nanopaper efficiently.
- Detected glial fibrillary acidic protein in human plasma using SERS on nanopaper-based analytical devices, enabling high-sensitive preclinical detection of Alzheimer's disease.

Mechanical Engineer & Investment Manager, XJTLU
Supervisors: Prof. Cezhou Zhao, XJTLU & Dr. Chun Zhao, XJTLU
Competitive Combat Robots Oct. 2020 - Oct. 2022
- Designed and fabricated mechanical components for robots, including the launching and mobility mechanisms, using several materials (*e.g.*, carbon fiber, resin, and nylon).

Visiting Student, Tsinghua University *Supervisor: Dr. Wenzeng Zhang, Tsinghua University*
Self-Adaptive Robot Hands Jan. 2018 - Aug. 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 EXPERIENCES

Student lecturer, XJTLU Optional Course Mar. 2021 - Mar. 2022
- Lectured undergraduate class of about 50 students; demonstrated robot hand techniques.

Student lecturer, XJTLU-Affiliated School Sep. 2021 - Aug. 2022
- Lectured high school student class of about 50 students; provided extracurricular courses.

SKILLS

Computer Skills & Software:
- *Programming*: C, Arduino, MATLAB
- *CAD/CAE*: SolidWorks, AutoCAD, ANSYS (workbench), Rhino
- *Graphic design*: Adobe Illustrator, Adobe Premiere Pro, 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)

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

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