HANG YUAN

775 Woodlot Drive, East Lansing, MI 48824
Tel.: (+1) 517-202-0942 • E-mail: yuanhan1@msu.edu
Website: https://enderhangyuan.github.io/

EDUCATION

Michigan State University (MSU) East Lansing, U.S.A.
Ph.D. student in Biomedical Engineering *From: Aug. 2024*
Xi'an Jiaotong-Liverpool University (XJTLU) Suzhou, China
B.Eng. in Mechatronics and Robotic Systems (First Class (Honours)) *Sep. 2020 - Jun. 2024*
University of Liverpool (UoL) Liverpool, United Kingdom
B.Eng. in Mechatronics and Robotic Systems (First Class (Honours)) *Sep. 2020 - Jun. 2024*

PUBLICATIONS

Peer-Reviewed Journal Papers:

1. **H. Yuan**, W. Yuan *et al*., Microfluidic-Assisted *Caenorhabditis elegans* Sorting: Current Status and Future Prospects. *Cyborg and Bionic Systems*, *4*, 0011, Apr. 2023. [Cover paper]
2. **H. Yuan**, W. Yuan *et al.*, Navigating the uncertainty: the impact of a student-centered final year project allocation mechanism on student performance. *Humanities and Social Sciences Communications*, *11*, 776, Jun. 2024.
3. J. Zhang†, S. Liu†, **H. Yuan**† *et al*., Deep Learning for Microfluidic-Assisted *Caenorhabditis elegans* Multi-Parameter Identification Using YOLOv7. *Micromachines*, *14*, 1339, Jun. 2023. † denotes equal contributions.
4. W. Yuan, **H. Yuan** *et al*., A SERS nanocellulose-paper-based analytical device for ultrasensitive detection of Alzheimer's disease. *Analytica Chimica Acta*, *1301*, 342447, May 2024.
5. W. Yuan, **H. Yuan** *et al*., Facile Microembossing Process for Microchannel Fabrication for Nanocellulose-Paper-Based Microfluidics. *ACS Applied Materials & Interfaces*, *15*(5), 6420-6430, Jan. 2023.
6. W. Yuan, **H. Yuan** *et al*., Microembossing: A Convenient Process for Fabricating Microchannels on Nanocellulose Paper-Based Microfluidics. *Journal of Visualized Experiments*, *200*, e65965, Oct. 2023.
7. J. Zhu, **H. Yuan** *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.
8. W. Yuan†, K. Jiao†, **H. Yuan** *et al.*, MOFs/Heterojunction Structures for Surface-enhanced Raman Scattering with Enhanced Sensitivity and Tailorability. *ACS Applied Materials & Interfaces*, *16*(20), 26374-26385, Apr. 2024. [Cover Paper] † denotes equal contributions.
9. P. Song, P. Ou, Y. Wang, **H. Yuan** *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.
10. L. Wang, L. He, F. Liu, **H. Yuan** *et al*., Mechanical Characterization of Multifunctional Metal-Coated Polymer Lattice Structures. *Materials*, *17*(3), 741, Feb. 2024.

11. K. Jiao, W. Cao, W. Yuan, **H. Yuan** *et al*., Cellulose Nanostructures as Tunable Substrates for Nanocellulose-Metal Hybrid Flexible Composites. *ChemPlusChem*, *2024*, e202300704, Feb. 2024.
12. S. Duan, T. Cai, F. Liu, Y. Li, **H. Yuan** *et al*., Automatic offline-capable smartphone paper-based microfluidic device for efficient biomarker detection of Alzheimer's disease. *Analytica Chimica Acta*, *1308*, 342575, Apr. 2024.

Peer-Reviewed Conference Papers:

1. **H. Yuan**, W. Zhang, 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. S. Duan, R. Yong, **H. Yuan** *et al*., Automated Offline Smartphone-Assisted Microfluidic Paper-Based Analytical Device for Biomarker Detection of Alzheimer's Disease. *46th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC'24)*, Orlando, U.S.A., Jul. 15-19, 2024. (Pending publication)
3. J. Sun, S. Duan, R. Yong, **H. Yuan** *et al*., An Automated Microfluidic Paper-Based Analytical Device for Chemiluminescence Immunoassay. *EMBC'24*, Orlando, U.S.A., Jul. 15-19, 2024. (Pending publication)
4. L. Wang, Z. Zhang, M. Chen, J. Xie, F. Liu, **H. Yuan** *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. **H. Yuan**†, R. Yong† *et al*., A Centrifugation-Assisted Lateral Flow Assay Platform for Bioassay Sensitivity and Visualization Enhancement. *EMBC'23*, Sydney, Australia, Jul. 24-27, 2023. [Poster] † denotes equal contributions.
2. W. Yuan, **H. Yuan** *et al*., Highly-integrated SERS-Based Immunoassay NanoPADs for Early Diagnosis of Alzheimer's Disease. *EMBC'23*, Sydney, Australia, Jul. 24-27, 2023. [Poster]
3. R. Yong†, W. Yuan†, **H. Yuan** *et al*. Nanocellulose-Paper-Based Analytical Devices with MOFs/Heterojunction Structures for Multiplex SERS Detection. *EMBC'24*, Orlando, U.S.A., Jul. 15-19, 2024. [Poster] † denotes equal contributions.
4. S. Liu, Y. Li, **H. Yuan** *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]
5. S. Duan, T. Cai, F. Liu, **H. Yuan** *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. **H. Yuan**, W. Zhang, A Cluster-Tube Self-Adaptive Robot Hand with Controllable Force for Rapid Grasping, CN109571539B[P], 2023. [Invention patent]
2. **H. Yuan**, A Parallel and Magnetic-Driven Robot Hand with Linkage Mechanisms, CN109531610B[P], 2023. [Invention patent]
3. **H. Yuan**, A Hedgehog-Inspired Magnetic-Driven Self-Adaptive Pin-Array Robot Hand,

CN109397278B[P], 2023. [Invention patent]

4. P. Song, S. Duan, E.G. Lim, T. Cai, **H. Yuan**, C. Zhao, A Smartphone-Based Automated Paper-Based Microfluidic System, CN116338159B[P], 2024. [Invention patent]
5. **H. Yuan**, W. Zhang, A Cluster-Tube Self-Adaptive Robot Hand with Controllable Force for Rapid Grasping, CN209533441U[P], 2019. [Utility model patent]
6. **H. Yuan**, A Hedgehog-Inspired Magnetic-Driven Self-Adaptive Pin-Array Robot Hand, CN209190774U[P], 2019. [Utility model patent]
7. **H. Yuan**, 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 - Jul. 2024

- Developed a CLFA platform with adjustable rotation speeds, enabling smartphone-based quantitative bioassay and active sample flow control.

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 - Jul. 2024

- Developed a facile microembossing process using plastic micro-molds to fabricate microchannels at micrometer-scale on nanopaper efficiently.
- Detected glial fibrillary acidic protein in artificial plasma using SERS on nanopaper-based analytical devices, enabling high-sensitive biomarker 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
Student lecturer, XJTLU-Affiliated School Sep. 2021 - Aug. 2022

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

- The IET Prize, The Institution of Engineering and Technology 2024
- Best Performance in Final Year Project (School-wide top 1), XJTLU 2024
- Final Year Project Best Student Poster (School-wide top 1), XJTLU 2024
- Outstanding Student (University-wide top 0.1%), Jiangsu Province, China 2024
- Excellent Student Cadre (University-wide top 0.1%), Jiangsu Province, China 2022
- 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
- **President & Liaison Minister**, XJTLU Sagittarius Astronomy Club 2021-2022