

# HANG YUAN

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## EDUCATION

### Michigan State University (MSU)

*Ph.D. student in Biomedical Engineering*

*Supervisor: Dr. Jinxing Li*

East Lansing, U.S.A.

*From: Aug. 2024*

### Xi'an Jiaotong-Liverpool University (XJTLU)

*B.Eng. in Mechatronics and Robotic Systems (First Class (Honours))*      *Sep. 2020 - Jun. 2024*

*Supervisor: Dr. Pengfei Song*

Suzhou, China

### University of Liverpool (UoL)

*B.Eng. in Mechatronics and Robotic Systems (First Class (Honours))*      *Sep. 2020 - Jun. 2024*

Liverpool, United Kingdom

## PUBLICATIONS

### Peer-Reviewed Journal Papers:

1. H. Yuan<sup>†</sup>, R. Yong<sup>†</sup>, W. Yuan<sup>†</sup> *et al.*, Centrifugation-assisted lateral flow assay platform: enhancing bioassay sensitivity with active flow control. *Microsystems & Nanoengineering*, *11*, 101, May 2025. [Feature article] <sup>†</sup> denotes equal contributions.
2. 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]
3. 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.
4. J. Zhang<sup>†</sup>, S. Liu<sup>†</sup>, H. Yuan<sup>†</sup> *et al.*, Deep Learning for Microfluidic-Assisted *Caenorhabditis elegans* Multi-Parameter Identification Using YOLOv7. *Micromachines*, *14*, 1339, Jun. 2023.
5. 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.
6. 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.
7. 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.
8. 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.
9. W. Yuan<sup>†</sup>, K. Jiao<sup>†</sup>, 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]

10. Y. Cai, C. Ronders, V. Mottini, H. Yuan *et al.*, Mycoelectronics: Bioprinted Living Fungal Bioelectronics for Artificial Sensation. [Under Review]
11. M. Lu<sup>†</sup>, W. Yuan<sup>†</sup>, R. Yong, H. Yuan *et al.*, Facile Laser Cutting Process for Nanocellulose-Paper-Based Microfluidic Microchannel Fabrication. *IEEE Sensors Journal*, 25, 4, 2025.
12. P. Song, P. Ou, Y. Wang, H. Yuan *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.
13. 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.
14. 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.
15. W. Yuan, K. Jiao, R. Yong, H. Yuan *et al.*, MOF-Assisted Nanocellulose Paper-Based Platform for Multiple Surface-Enhanced Raman Scattering Detection, *Analytical Chemistry*, 97, 35, Aug. 2025. [Cover paper]
16. 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. *12<sup>th</sup> International Conference on Intelligent Robotics and Applications (ICIRA)*, 5(12), 684-695, Shenyang, China, Aug. 8-11, 2019.
2. W. Yuan, H. Yuan *et al.*, Transfer Printing Assisted Fabrication of a Cicada Wing Inspired Nanopaper SERS Platform. *2025 International Conference on Advanced Mechatronic Systems (ICAMechS)*, 220-225, Xian, China, Sep. 19-22, 2025.
3. S. Duan, R. Yong, H. Yuan *et al.*, Automated Offline Smartphone-Assisted Microfluidic Paper-Based Analytical Device for Biomarker Detection of Alzheimer's Disease. *46<sup>th</sup> Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC'24)*, Orlando, U.S.A., Jul. 15-19, 2024.
4. 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.
5. 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, U.S.A., Oct. 29-Nov. 2, 2023.

#### **CONFERENCE PARTICIPATION**

1. H. Yuan, L. J. Heller *et al.*, Biosynthetic Additive Manufacturing of Structural Materials through Mycelium-Bacteria Consortia. *2026 MRS Spring Meeting & Exhibit*, Honolulu, U.S.A., Apr. 26-May 1, 2026. [Oral]
2. H. Yuan, L. J. Heller *et al.*, Biosynthetic Additive Manufacturing of Structural Materials through Mycelium-Bacteria Consortia. *18<sup>th</sup> Annual Graduate Academic Conference*, East Lansing, U.S.A., Feb. 21, 2026. [Poster]
3. H. Yuan<sup>†</sup>, R. Yong<sup>†</sup> *et al.*, A Centrifugation-Assisted Lateral Flow Assay Platform for

- Bioassay Sensitivity and Visualization Enhancement. *EMBC'23*, Sydney, Australia, Jul. 24-27, 2023. [Poster] <sup>†</sup> denotes equal contributions.
4. 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]
  5. R. Yong<sup>†</sup>, W. Yuan<sup>†</sup>, 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]
  6. S. Liu, Y. Li, H. Yuan 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]
  7. S. Duan, T. Cai, F. Liu, H. Yuan 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. 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]

## STUDENT MENTORSHIP

### Undergraduate Researchers

Linux Joseph Jones Heller (Visiting student, Jan. 2025 - Aug. 2025, MSU), Current position: Incoming Ph.D. student at the University of Toronto  
 Grant Hubbard (May 2025 - Present, MSU)  
 Eleanor DelPlace (Sep. 2025 - Present, MSU)  
 Soham Inamdar (Jan. 2025 - Present, MSU), Current position: Incoming Master student at the University of Michigan  
 Nemo Liu (Sep. 2025 - Present, MSU)

## PROFESSIONAL SERVICES

|   |                       |
|---|-----------------------|
| Symposium Assistant, MRS Spring Meeting & Exhibit | Apr. 2026 - May 2026  |
| BME Graduate Mentor, MSU                          | Aug. 2025 - Jan. 2026 |

## RESEARCH EXPERIENCES

|  |   |
|--|---|
| <b>Graduate Research Assistant, MSU</b><br>Living materials  | <i>Supervisor: Dr. Jinxing Li, MSU</i><br>Aug. 2024 - Present       |
| <b>Undergraduate Research Assistant, XJTLU</b><br>Paper-based microfluidics for biomarker detection  | <i>Supervisor: Dr. Pengfei Song, XJTLU</i><br>Jan. 2022 - Jun. 2024 |
| <b>Mechanical Engineer &amp; Investment Manager, XJTLU</b><br><i>Supervisors: Prof. Cezhou Zhao, XJTLU &amp; Dr. Chun Zhao, XJTLU</i><br>Competitive Combat Robots | Oct. 2020 - Oct. 2022   |
| <b>Visiting Student, Tsinghua University</b> <i>Supervisor: Dr. Wenzeng Zhang, Tsinghua University</i><br>Self-Adaptive Robot Hands                                | Jan. 2018 - Aug. 2019   |

## TEACHING EXPERIENCES

|   |                       |
|---|-----------------------|
| Student lecturer, XJTLU Optional Course   | Mar. 2021 - Mar. 2022 |
| Student lecturer, XJTLU-Affiliated School | Sep. 2021 - Aug. 2022 |

## PROFESSIONAL SOCIETY MEMBERSHIP

Associate membership, The Institution of Engineering and Technology (IET)

## SELECTED HONORS & AWARDS

- The IET Prize, The Institution of Engineering and Technology 2024
- Excellent Undergraduate Final Year Project Award, Jiangsu Province, China 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

## ACTIVITIES

- Executive Director, Yuanhe Technology (Changzhou) Co., Ltd. 2022-2025
- President, XJTLU Sagittarius Astronomy Club 2021-2022

## SKILLS

### Computer Skills & Software:

- *Programming:* C, Arduino, MATLAB
- *CAD/CAE:* SolidWorks, Blender, AutoCAD, ANSYS (workbench)
- *Graphic design:* Adobe Illustrator, Adobe Premiere Pro, Adobe Photoshop, KeyShot, Origin

### Experimental Skills:

- *Fabrication:* 3D printing, Wax printing, Laser cutting, Two-photon polymerization (2PP)
- *Immunoassays:* Enzyme-linked immunosorbent assay (ELISA), Lateral flow assay (LFA)
- *Microbiology:* Fungal and bacterial cultures
- *Chemical synthesis:* AuNPs, AgNPs, Liquid crystal elastomers
- *Characterization:* UV-vis, FTIR, SEM, EDX, SERS, XRD, Confocal microscope

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