Jun Liu

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ACADEMIC APPOINTMENTS

- Associate Professor   University of Hong Kong (HKU)   09/2024
- Associate Professor   City University of Hong Kong (CityU)   07/2024
- Assistant Professor   City University of Hong Kong (CityU)   09/2019

EDUCATION

- **Cornell University** (Cornell)   2017 – 2019
  Postdoctoral Fellow, Dalio Institute of Cardiovascular Imaging
- **University of Toronto** (U of T)   2011 – 2016
  Ph.D. in Mechanical Engineering
- **Shandong University** (SDU)   2004 – 2008
  B.Eng. in Automation and B.Sc. in Economics

SELECTED HONORS & AWARDS

- **MARSS Big-on-Small Award Finalist, 2023**
  International Conference on Manipulation, Automation and Robotics at Small Scales
- **IEEE TASE Best Application Award**
  IEEE Transactions on Automation Science and Engineering, 2018
- **ICIA Gaitech Best Paper in Robotics Award**
  IEEE International Conference on Information and Automation, Ningbo, China, 2016
- **ICRA Best Student Paper Award**
  IEEE International Conference on Robotics and Automation, Hong Kong, 2014
- **ICRA Best Manipulation Paper Award Finalist**
  IEEE International Conference on Robotics and Automation, Hong Kong, 2014
- **ICRA Best Medical Robotics Paper Award Finalist**
  IEEE International Conference on Robotics and Automation, Hong Kong, 2014
- **CityU MNE Online Teaching Award, 2020**
  City University of Hong Kong, 2020
- **TRCHR Fellowship**
  Ted Rogers Center for Heart Research, Toronto, 2015-2016
- **Mart Liinve Graduate Scholarship**
  University of Toronto, Toronto, 2014
- **CSC Scholarship, 2011-2015**
  Chinese Scholarship Council, China
- **Weichai Power Scholarship, 2010**
  Shandong University, Shandong, China
- **Foxconn Scholarship, 2007**
  Shandong University, Shandong, China
- **IEEE RAS Travel Award, ICRA 2014**

IEEE Robotics and Automation Society

RESEARCH Activities

2019 – to present   **City University of Hong Kong**
- Soft Medical Robotics for Cardiovascular Engineering
- Magnetic Driven Micro Robotics
- Artificial Intelligence for Medical Image Analysis
- Micro Robotic Manipulation for Industrial and Biomedical Applications

2017 – 2019   **Cornell University**
- Robotically Assisted Cardiac Surgery with Augmented Reality
- Soft Robotic Device for Closure of the Left Atrial Appendage (LAA)

2011 – 2016   **University of Toronto**
- Robotic Adherent Cell Manipulation
- Digital Microfluidic Processing of Cryopreservation of Human Embryos
- Robotic Vitrification of Human Oocytes and Embryos
- Quantitative Analysis of Sperm Locomotion

2008 – 2011   **Shandong University**
- Intelligent and Agile Platform for Home Service Robot
- Intelligent Space Robotic System for Hospital Patient Monitoring
- AnHua Humanoid Robot Project

Awarded Research GRANTs/Contracts

Since 2019 (After CityU)

Project Title	Grantor/Type	Role	Duration	Budget
Automated Construction Robot for Gypsum Block Wall Laying	ITC/PRP	PC	2023/07-2025/06	$1,600,000
A Fully Automated Adherent Cell Injection System for High-throughput Drug Screening	RGC/GRF	PI	2022/01-2024/12	$815,601
A New Augmented Reality Assisted Image Guidance System for Cardiac Interventions	RGC/ECS	PI	2021/01-2023/12	$831,559
Development of A New Microrobotic System for Cryopreservation of Reproductive Cells	RGC/GRF	PI	2023/01-2025/12	$1,098,559
3D Augmented Reality Guided Navigation for Interventional Treatment	MainGov/ShenzhenC	PI	2022/04-2024/04	$1,261,198
Magnetically Guided Soft Robotic Catheter to Deliver Stem Cells for Novel Cell-based Cardiac Regeneration Therapy	CityU/SIRG	PI	2022/05-2024/04	$300,000
Micro/Nano Robotic Platforms for Intracellular Measurement and Manipulation	CityU/APRC	PI	2019/09-2023/02	$1,680,000
Research on AR-Assisted Navigation Technology for Medical Robotics	Guangdong/NSF	PI	2020/01-2022/12	$136,931

Before CityU (Grant application and participation)

- "Automated gap junction function measurement and high-throughput drug screen to identify therapies for arrhythmogenic cardiomyopathies", CAD$48,000, PI: Jun Liu, funded by TRCHR (Ted Rogers Centre for Heart Research), 2015-2017,

- "Automated assays of gap junction functions and screening of drugs for rescuing conduction in heart tissues", CAD $601,877, grant preparation, funded by CHRP (Collaborative Health Research Projects), 2015-2018.

- "Development of techniques for automated cell transfer in cryopreservation", CAD $25,000, grant preparation, funded by NSERC (Natural Sciences and Engineering Research Council of Canada) Engage Grant, 2015.

- "Development of an automated instrument to standardize embryo vitrification in IVF clinics", $125,000, grant preparation, funded by NSERC I2I, 2015-2016.

- "Development of an automated blood cell counting system for clinical assessment of feto-maternal hemorrhage", grant preparation, funded by NSERC I2I, 2014-2015.

SELECTED PUBLICATIONS

- **Refereed Journal Papers**
  - *   corresponding author or first author

[56] Z. Wei, Z. Li, Y. Xiang, **J. Liu***, and J. Zhang, "Magnetic Repulsion-Based Robot with Diverse Locomotion Capabilities," *IEEE Robotics and Automation Letters*, vol. 9, no. 1, pp. 398-405, Jan. 2024, doi: 10.1109/LRA.2023.3334557.

[55] M. Zhu, J. Liao, **J. Liu***, and Y. Yuan, "FedOSS: Federated Open Set Recognition via Inter-client Discrepancy and Collaboration," *IEEE Transactions on Medical Imaging*, vol. 43, no. 1, pp. 190-202, Jan. 2024, doi: 10.1109/TMI.2023.3294014.

[54] W. Dai, Z. Wu, R. Liu, T. Wu, M. Wang, J. Zhou, Z. Zhang, and **J. Liu***, "Automated Non-Invasive Analysis of Motile Sperms Using Sperm Feature-Correlated Network," *IEEE Transactions on Automation Science and Engineering*, vol. 21, no. 3, pp. 1-11, May 2024, doi: 10.1109/TASE.2024.3404488

[53] Y. Xiang, R. Liu, Z. Wei, X. Wang, W. Kang, M. Wang, **J. Liu**, X. Liang, and J. Zhang, "MINRob: A Large Force-Outputting Miniature Robot Based on a Triple-Magnet System," *IEEE Transactions on Robotics*, vol. 40, pp. 3127-3145, Jun. 2024, doi: 10.1109/TRO.2024.3410096.

[52] W. Dai, T. Wu, R. Liu, M. Wang, and **J. Liu***, "Any region can be perceived equally and effectively on rotation pretext task using full rotation and weighted-region mixture," *Neural Networks*, vol. 176, Apr. 2024, doi: 10.1016/j.neunet.2024.106350.

[51] K. Shang, T. Wu, X. Jin, Z. Zhang, C. Li, R. Liu, M. Wang, W. Dai, and **J. Liu***, "Coaxiality prediction for aero-engines precision assembly based on geometric distribution error model and point cloud deep learning," *Journal of Manufacturing Systems*, vol. 71, pp. 681–694, Dec. 2023, doi: 10.1016/j.jmsy.2023.10.017. IF: 12.1

[50] Z. Wei, Z. Li, Y. Xiang, **J. Liu***, and J. Zhang*, "Magnetic Repulsion-Based Robot With Diverse Locomotion Capabilities," *IEEE Robot. Autom. Lett.*, vol. 9, no. 1, pp. 398–405, Jan. 2024, doi: 10.1109/LRA.2023.3334557.

[49] M. Wang, T. Wu, R. Liu, Z. Zhang, and **J. Liu***, "Selective and Independent Control of Microrobots in a Magnetic Field," *Engineering*, 2023, doi: 10.1016/j.eng.2023.02.011.

[48] W. Dai, R. Liu, T. Wu, M. Wang, J. Yin, and **J. Liu***, "Deeply Supervised Skin Lesions Diagnosis with Stage and Branch Attention," *IEEE Journal of Biomedical and Health Informatics*, accepted, pp. 1–12, 2023, doi: 10.1109/JBHI.2023.3308697.

[47] R. Liu, Y.D. Zhu, C. Wu, H. Guo, W. Dai, T. Wu, M. Wang, W.J. Li, **J. Liu***, "Interactive Dual Network with Adaptive Density map for Automatic Cell Counting," *IEEE Trans, Autom, Sci, Eng.,* accepted, pp. 1–13, 2023, doi: 10.1109/TASE.2023.3329973.

[46] M. Wang, J. Zhang, R. Liu, T. Wu, W. Dai, R. Liu, J. Zhang, and **J. Liu***, "Liquid Metal-Based Flexible Sensor for Perception of Force Magnitude, Location, and Contacting Orientation", *IEEE Transactions on Instrumentation & Measurement*, vol. 72, pp. 1–11, 2023, doi: 10.1109/ TIM.2023.3265759.

[45] M. Zhu, J. Liao, **J. Liu***, and Y. Yuan*, "FedOSS: Federated Open Set Recognition via Inter-client Discrepancy and Collaboration," *IEEE Trans. Med. Imaging*, pp. 1–1, 2023, doi: 10.1109/TMI.2023.3294014.

[44] R. Liu, W. Dai, T. Wu, M. Wang, S. Wan, and **J. Liu***, "AIMIC: Deep Learning for Microscopic Image Classification," *Computer Methods and Programs in Biomedicine,* vol. 226, p. 107162, Nov. 2022, doi: 10.1016/j.cmpb.2022.107162.

[43] S. Yuan, S. Cao, J. Xue, S. Su, J. Yan, M. Wang, W. Yue, S. S. Cheng, **J. Liu**, J. Wang, S. Song, M. Q. H. Meng, and H. Ren, "Versatile Motion Generation of Magnetic Origami Spring Robots in the Uniform Magnetic Field," *IEEE Robotics & Automation Letters*, vol. 7, no. 4, pp. 10486-10493, 2022.

[42] X. Guo, Z. Chen, **J. Liu***, and Y. Yuan*, "Non-equivalent images and pixels: Confidence-aware resampling with meta-learning mixup for polyp segmentation," *Medical Image Analysis*, vol. 78, no. 102394, 2022.

[41] X. Han, F. Lu, J. Yin, G. Tian, and **J. Liu*,** "Sign Language Recognition Based on R(2+1)D With Spatial-Temporal-Channel Attention," *IEEE Transactions on Human-Machine Systems*, vol. 52, no. 4, pp. 687-698, 2022.

[40] J. Yin, Y. Wu, C. Zhu, Z. Yina, H. Liu, Y. Dang, Z. Liu, and **J. Liu***, "Energy-based Periodicity Mining with Deep Features for Action Repetition Counting in Unconstrained Videos," *IEEE Trans. Circuits Syst. Video Technol.,* pp. 1–1, 2021, doi: 10.1109/TCSVT.2021.3055220.

[39] L. Hong, X. Wang, Z. Xiao, G. Zhang, and **J. Liu*,** "WSUIE: Weakly Supervised Underwater Image Enhancement for Improved Visual Perception," *IEEE Robot. Autom. Lett.*, vol. 6, no. 4, pp. 8237–8244, Oct. 2021, doi: 10.1109/LRA.2021.3105144.

[38] M. Wang, S. Song, **J. Liu*,** and M. Q.-H. Meng, "Multipoint Simultaneous Tracking of Wireless Capsule Endoscope Using Magnetic Sensor Array," *IEEE Trans. Instrum. Meas.*, vol. 70, pp. 1–10, 2021, doi: 10.1109/TIM.2021.3075776.

[37] R. Liu, M. Wang, M. Wang, J. Yin, Y. Yuan, and **J. Liu***, "Automatic Microscopy Analysis with Transfer Learning for Classification of Human Sperm," *Appl. Sci.*, vol. 11, no. 12, p.

5369, Jun. 2021, doi: 10.3390/app11125369.

[36] S. Wan, J. Hu, and **J. Liu*,** "Anatomical or functional repair for ischemic mitral regurgitation: Find the right antidote*!,"* *J. Thorac. Cardiovasc. Surg.*, Feb. 2021, doi: 10.1016/j.jtcvs.2021.01.073.

[35] X. Liu, J. Yin, J. Liu, P. Ding, J. Liu*****, and H. Liu, "TrajectoryCNN: A New Spatio-Temporal Feature Learning Network for Human Motion Prediction," *IEEE Trans. Circuits Syst. Video Technol.*, vol. 31, no. 6, pp. 2133–2146, Jun. 2021, doi: 10.1109/TCSVT.2020.3021409.

[34] S.J. Jang, M. Torabinia, H. Dhrif, A. Caprio, **J. Liu,** S. C. Wong, and B. Mosadegh, "Development of a Hybrid Training Simulator for Structural Heart Disease Interventions", *Advanced Intelligent Systems*, DOI: 10.1002/aisy.202000109, 2020.

[33] S. Wan and **J. Liu**, "Decode a ticking time-bomb," *J. Thorac. Dis.*, vol. 12, no. 9, pp. 4598–4601, Sep. 2020, doi: 10.21037/jtd-2020-52.

[32] S. Wan and **J. Liu**, "Strength at the cutting edge," *J. Thorac. Cardiovasc. Surg.*, vol. 2, pp. 58–59, Jun. 2020, doi: 10.1016/j.xjtc.2020.02.008.

[31] **J. Liu,** G. Singh, S. Al'Aref, B. Lee, O. Oleru, J. K. Min, S. Dunham, M. R. Sabuncu, B. Mosadegh. "Review of Image Registration in Medical Robotics and Intelligent Systems: Fundamentals and Applications" *Advanced Intelligent Systems,* 1900048, 2019. doi: 10.1002/aisy.201900048

[30] **J. Liu,** S. Al'Aref, G. Singh, A. Caprio, A. A. Amiri Moghadam, S.J. Jang, S. Chiu Wong, J. K. Min, S. Dunham, B. Mosadegh. "An Augmented Reality System for Image Guidance of Percutaneous Cardiac Interventions" *PLOS ONE* 14(7), e0219174, 2019

[29] **J. Liu,** Z.R. Zhang, X. Wang, H.J. Liu, Q.L. Zhao, Y. Sun, "Automated Robotic Measurement of 3D Cell Morphologies," *IEEE Robotics & Automation Letters*, vol. 2, no. 2, pp. 499-505, 2017

[28] Z.R. Zhang*, **J. Liu*,** X. Wang, Q.L. Zhao, S.R. Xie, Y. Sun, "Robotic Pick-and-Place of Multiple Embryos for Vitrification", *IEEE Robotics & Automation Letters*, vol. 2, no. 2, pp. 570-576, Apr. 2016. (*Co-first author)

[27] Z.R. Zhang, **J. Liu*,** J. Meriano, C.H. Ru, S.R. Xie, J. Luo, and Y. Sun, "Human sperm rheotaxis: a passive physical process," *Scientific Reports*, Vol. 6, article number: 23553, 2016. (*Co-first author)

[26] **J. Liu,** J. Wen, Z.R. Zhang, H.J. Liu, and Y. Sun, "Voyage inside the Cell: Microsystems and Nanoengineering for Intracellular Manipulation and Characterization", *NPJ. Microsystem & Nanoengineering*, vol. 1, p. 15020, 2015.

[25] **J. Liu,** C.Y. Shi, J. Wen, D.G. Pyne, H.J. Liu, C.H. Ru, S.R. Xie, Y. Sun, "Automated Vitrification of Embryos – A Robotics Approach," *IEEE Robotics & Automation Magazine*, vol. 22, pp. 33-40, 2015. (**Featured Article**)

[24] **J. Liu,** V. Siragam, Z. Gong, J. Chen, M.D. Fridman, C. Leung, Z. Lu, C.H. Ru, S.R. Xie, J. Luo, R. Hamilton, and Y. Sun, "Robotic adherent cell injection (RACI) for characterizing cell-cell communication," *IEEE Transactions on Biomedical Engineering*, vol. 62, no. 1, pp. 119-24, 2015.

[23] **J. Liu,** Z. Gong, K. Tang, Z. Lu, C. Ru, J. Luo, S. Xie, and Y. Sun, "Locating end-effector tips in robotic micromanipulation," ***IEEE Transactions on Robotics***, Vol. 30, pp. 125-30, 2014.

[22] **J. Liu,** V. Siragam, J. Chen, M.D. Fridman, R.M. Hamilton, and Y. Sun, "High-throughput measurement of gap junctional intercellular communication," *American Journal of Physiology - Heart and Circulatory Physiology (AJP-Heart),* Vol. 306, pp. H1708-13, 2014.

[21] **J. Liu,** C. Leung, Z. Lu, and Y. Sun, "Quantitative analysis of locomotive behavior of human sperm head and tail," *IEEE Transactions on Biomedical Engineering*, Vol. 60, pp. 390-396, 2013.

[20] **J. Liu,** C. Moraes, Z. Lu, C.A. Simmons, and Y. Sun, "Single cell deposition," *Methods in Cell Biology,* Vol. 112, pp. 403-420, 2012.

[19] Z. Zhang, X. Wang, **J. Liu,** C. Dai, and Y. Sun, "Robotic Micromanipulation: Fundamentals and Applications," *Annual Review of Control Robotics and Autonomous Systems*, vol. 2, no. 1, p. annurev-control-053018- 023755, May 2019.

[18] J. Yin, X. Liu, F.C. Fu, H. Liu, Z. Liu, B. Wang, **J. Liu**, Y. Yin, "One-Shot SADI-EPE: A Visual Framework of Event Progress Estimation," IEEE Trans. Circuits Syst. Video Technol., vol. 29, no. 6, pp. 1659–1671, Jun. 2019.

[17] X. Wang, Q.L. Zhao, L. Wang, **J. Liu**, H.Y. Pu, S.R. Xie, C.H. Ru, and Y. Sun, "Effect of cell inner pressure on deposition volume in microinjection," *Langmuir*, vol. 34, no. 35, pp. 10287–92, 2018.

[16] Z.R. Zhang, C.S. Dai, J. Huang, X. wang, **J. Liu**, C.H. Ru, H.Y. Pu, S.R. Xie, J.Y. Zhang, S. Moskovtsev, C. Librach, K. Jarvi, and Yu Sun, "Robotic immobilization of motile sperm for clinical intracytoplasmic sperm injection," *IEEE Trans. Biomedical Engineering*, vol. 66, no. 2, pp. 444-452, Feb. 2019

[15] X. Wang, Z. Zhang, H. Tao, **J. Liu,** S. Hopyan, eta Y. Sun, Characterizing Inner Pressure and Stiffness of Trophoblast and Inner Cell Mass of Blastocysts», Biophys. J., vol. 115, no. 12, pp. 2443–2450, Dec. 2018.

[14] X. Wang, M. Luo, H. Wu, Z.R. Zhang**, J. Liu,** Z.S. Xu, W. Johnson, Y. Sun, "A 3D Magnetic Tweezer System for Intra-Embryonic Navigation and Measurement", *IEEE Transaction on Robotics*, Vol. 34, pp. 240-247, 2018.

[13] W. Johnson, C. Dai, **J. Liu**, X. Wang, D. K. Luu, Z. Zhang, C. Ru, C. Zhou, M. Tan, H. Pu, S. Xie, Y. Peng, J. Luo, and Y. Sun, "A Flexure-Guided Piezo Drill for Penetrating the Zona Pellucida of Mammalian Oocytes," *IEEE Trans. Biomed. Eng.*, vol. 65, no. 3, pp. 678–686, 2018, doi: 10.1109/TBME.2017.2713302.

[12] C.Y. Shi, D.K. Luu, Q.M. Yang, **J. Liu**, J. Chen, C.H. Ru, S.R. Xie, Jun Luo, J. Ge, and Y. Sun, "Recent advances in nanorobotic manipulation inside scanning electron microscopes," *Microsystems & Nanoengineering*, Vol. 2, no. 16024, 2016.

[11] J. Ge, S. Xie, Y. Wang, **J. Liu,** H. Zhang, B. Zhou, F. Weng, C. Zhou, M. Tan, and Y. Sun, "A system for automated detection of ampoule injection impurities", *IEEE Transactions on Automation Science and Engineering,* Vol. 14, No. 2, pp. 19-28, 2017. (***Best New Application Award***)

[10] D.G. Pyne*, **J. Liu*,** M. Abdelgawad, and Y. Sun, "Digital microfluidic processing of

mammalian embryos for vitrification," *PLoS ONE*, Vol. 9, No. 9, pp. e108128-14, 2014.

[9] P. Sharma, C. Abbasi, S. Lazic, A.C. Teng, D. Wang, N. Dubois, V. Ignatchenko, V. Wong, **J. Liu,** T. Araki, M. Tiburcy, C. Ackerley, W. H. Zimmermann, R. Hamilton, Y. Sun, P. P. Liu, G. Keller, I. Stagljar, I. C. Scott, T. Kislinger, and A. O. Gramolini, "Evolutionarily conserved intercalated disc protein Tmem65 regulates cardiac conduction and connexin 43 function.," *Nature Communications*, vol. 6, p. 8391, 2015.

[8] C. Ru, **J. Liu,** M. Pang, and Y. Sun, "Controlled ultrasonic micro-dissection of thin tissue sections," *Biomedical Microdevices*, vol. 16, no. 4, pp. 567–573, Aug. 2014.

[7] Z. Gong, B.K. Chen, **J. Liu,** and Y. Sun, "Robotic probing of nano structures inside scanning electron microscopy," *IEEE Trans. Robotics,* Vol. 30, pp. 758-765, 2014.

[6] J. Ge, Z. Gong, J. Chen, **J. Liu,** J. Nguyen, Z. Yang, C. Wang, and Y. Sun, "A System for Counting Fetal and Maternal Red Blood Cells," *IEEE Transactions on Biomedical Engineering,* vol. 61, no. 12, pp. 2823–2829, Dec. 2014.

[5] Z. Gong, B.K Chen, **J. Liu,** C. Zhou, D. Anchel, X. Li, J. Ge, D.P. Bazett-Jones, and Y. Sun, "Fluorescence and SEM correlative microscopy for nanomanipulation of sub-cellular structures," *Light: Science & Applications*, vol. 3, no. September, pp. 1–7, 2014, doi: 10.1038/lsa.2014.105.

[4] H.J. Liu, J. Wen, Y. Xiao, **J. Liu,** S. Hopyan, M. Radisic, C.A. Simmons, and Y. Sun, "In situ mechanical characterization of cell nucleus by atomic force microscopy," *ACS Nano,* Vol. 8, pp. 3821-8, 2014.

[3] V. Siragam, X. Cui, S. Masse, C. Ackerley, S. Aafaqi, L. Strandberg, M. Tropak, M. D. Fridman, K. Nanthakumar, **J. Liu,** Y. Sun, B. Su, C. Wang, X. Liu, Y. Yan, A. Mendlowitz, and R. M. Hamilton, "Tmem43 mutation p.s358l alters intercalated disc protein expression and reduces conduction velocity in arrhythmogenic right ventricular cardiomyopathy," *PLoS ONE*, vol. 9, no. 10, pp. e109128, 2014.

[2] B. Y. Song, G. H. Tian, **J. Liu,** F. Y. Zhou, and Y. R. Zhang, "Zigbee wireless sensor networks based detection and help system for elderly abnormal behaviors in service robot intelligent space," *Applied Mechanics and Materials,* vol. 48–49, pp. 1378–1382, 2011.

[1] **J. Liu,** G. H. Tian, R. K. Li, X. K. Liu, "Human Machine Interface Based on Hand Gesture Recognition in Intelligent Space," Journal of Beijing Union University, Vol. 24, pp. 14-17, 2010.

- **Peer-reviewed Conference Papers**

[22] J. Zhou, R. Liu, M. Wang, T. Wu, W. Dai, X. Zhang, and **J. Liu*,** "SonicPlex: Simultaneous Arrangement of Massive Particles through a Simple Acoustic Micromanipulation Platform," in 2023 International Conference on Manipulation, Automation and Robotics at Small Scales (MARSS), 2023, pp. 1–6, doi: 10.1109/MARSS58567.2023.10294123.

[21] J.Q. Yin, J. Liu, J.Y. Wang and **J. Liu**, Multi-task Learning Network for CT Whole Heart Segmentation, in 2023 IEEE International Conference on CYBER Technology in Automation, Control, and Intelligent Systems, Jul. 2023.

[20] M. Wang, Z. Li, W. Dai, R. Liu, S. Yuan, and **J. Liu**, "On-Chip Transportation and Mixing of Microsample Using Electrohydrodynamic Flow," in 2022 International Conference on Manipulation, Automation and Robotics at Small Scales (MARSS), Jul. 2022, pp. 1–6, doi: 10.1109/MARSS55884.2022.9870510.

[19] C. Qi, J. Yin, H. Liu, and **J. Liu**, "Neighborhood Spatial Aggregation based Efficient Uncertainty Estimation for Point Cloud Semantic Segmentation," in 2021 IEEE International Conference on Robotics and Automation (ICRA), May 2021, pp. 14025–14031, doi: 10.1109/ICRA48506.2021.9560972.

[18] M. Wang, K. Y. Leung, R. Liu, S. Song, Y. Yuan, J. Yin, M. Q.-H. Meng, and **J. Liu**, "Dynamic tracking for microrobot with active magnetic sensor array," in 2021 IEEE International Conference on Robotics and Automation (ICRA), May 2021, pp. 7288–7294, doi: 10.1109/ICRA48506.2021.9561854.

[17] Y. Dang, F. Yang, B. Su, J. Yin, and **J. Liu**, "DBNet: A new generalized structure efficient for classification," IEEE Int. Conf. Robot. Biomimetics, ROBIO 2019, no. December, pp. 2169–2174, 2019, doi: 10.1109/ROBIO49542.2019.8961680.

[16] **J. Liu**, G. Singh, S.J. Al'Aref, A. Caprio, J.K. Min, S. Dunham, and B. Mosadegh, "Registration of Fluoroscopy and CT Images for Augmented Reality Assisted Percutaneous Cardiac Interventions", in Proceedings of the 40th International Conference of the IEEE Engineering in Medicine and Biology Society, Honolulu, HI, U.S., 2018

[15] Z.R. Zhang, C.S. Dai, J. Huang, X. Wang, **J. Liu**, J.Y. Zhang, S. Moskovtsev, C. Librach, K. Jarvi, and Y Sun, "Robotic Immobilization of Motile Sperm", in 2018 IEEE International Conference on Robotics and Automation (ICRA), pp. 1-6, Queensland, Australia, 2018.

[14] X. Wang, M. Luo, H. Wu, Z.R. Zhang, **J. Liu**, Z.S. Xu, W. Johnson, Y. Sun, "Three-Dimensional Robotic Control of a 5-Micrometer Magnetic Bead for Intra-Embryonic Navigation and Measurement", in 2017 IEEE International Conference on Robotics and Automation (ICRA), pp. 1-6, Singapore, 2017

[13] **J. Liu,** Z. Zhang, H. Tao, J. Ge, H. Liu, J. Wen, S. Hopyan, S. Xie, and Y. Sun, "Robotic Fluidic Jet for Automated Cellular and Intracellular Mechanical Characterization," *in 2016 IEEE International Conference on Information and Automation (ICIA)*, pp. 1-6, Ningbo, China, 2016. **(Gaitech Best Paper in Robotics Award)**

[12] Z. Zhang, **J. Liu,** J. Meriano, C. Ru, S. Xie, J. Luo, and Y. Sun, "An automated system for investigating sperm orientation in fluid flow," in 2016 IEEE International Conference on Robotics and Automation (ICRA), pp. 3661–3666, Stockholm, 2016.

[11] **J. Liu,** Chaoyang Shi, Jun Wen, D. Pyne, Haijiao Liu, C. Ru, and Y. Sun, "Automated robotic vitrification of embryos," in *2015 IEEE International Conference on Robotics and Automation (ICRA)*, pp. 2685–2690, Seattle, US, 2015.

[10] Jun Wen*, **J. Liu*,** K. Lau, Haijiao Liu, S. Hopyan, and Y. Sun, "Automated micro-aspiration of mouse embryo limb bud tissue," in *2015 IEEE International Conference on Robotics and Automation (ICRA)*, pp. 2667–2672, Seattle, US, 2015. *(*Authors contributed equally)*

[9] **J. Liu,** V. Siragam, Z. Gong, J. Chen, C. Leung, Z. Lu, C. H. Ru, S. R. Xie, J. Luo, R. Hamilton, and Y. Sun, "Automated microrobotic characterization of cell-cell communication," in *2014*

IEEE International Conference on Robotics and Automation (ICRA), pp. 469–474, Hong Kong, 2014. **(Best Student Paper Award Winner & Best Manipulation Paper Award Finalist)**

[8] J. Ge, Z. Gong, J. Chen, **J. Liu,** J. Nguyen, Z. Y. Yang, C. Wang, and Y. Sun, "A system for automated counting of fetal and maternal red blood cells in clinical KB test," in *2014 IEEE International Conference on Robotics and Automation (ICRA)*, pp. 1706–1711, Hong Kong, 2014. **(Best Medical Robotics Paper Finalist)**

[7] Z. Gong, B. K. Chen, **J. Liu,** C. Zhou, D. Anchel, X. Li, D. P. Bazett-Jones, and Y. Sun, "Correlative microscopy for nanomanipulation of sub-cellular structures," in *2014 IEEE International Conference on Robotics and Automation (ICRA)*, pp. 5209–5214, Hong Kong, 2014.

[6] **D. G. Pyne*, J. Liu*,** M. Abdelgawad, and Y. Sun, "Automated vitrification of mammalian embryos on a digital microfluidic device," in *2014 IEEE 27th International Conference on Micro Electro Mechanical Systems (MEMS)*, pp. 829–832, 2014. *(*Authors contributed equally)*

[5] **J. Liu,** Z. Gong, K. Tang, Z. Lu, and Y. Sun, "Locating end-effector tips in automated micromanipulation," in *2013 IEEE International Conference on Robotics and Automation*, pp. 1724–1729, Karlsruhe, Germany, 2013. **(Nominated for Best Student Paper Award)**

[4] Z. Gong, B. K. Chen, **J. Liu,** and Y. Sun, "Automated nanoprobing under scanning electron microscopy," in *2013 IEEE International Conference on Robotics and Automation*, pp. 1433–1438. Karlsruhe, Germany, 2013,

[3] H. Liu, J. Wen, **J. Liu,** S. Hopyan, C. Simmons, and Y. Sun, "Mechanical characterization of cancer cell nuclei in situ," in *the 9th IEEE International Conference on Nano/Micro Engineered and Molecular Systems (NEMS)*, pp. 669–673, Hawaii, US, 2014.

[2] L. MacQueen, Z. Gong, B.K. Chen, **J. Liu,** H.J. Liu, C.A. Simmons, and Y. Sun, "Natural leaf replicas to study cell contact guidance," The 17th International Conf. on Miniaturized Systems for Chemistry and Life Sciences (MicroTAS), Freiburg, Germany, Oct. 27-31, 2013.

[1] **J. Liu,** C. Leung, Z. Lu, and Y. Sun, "Analyzing sperm velocity and tail behavior for automated sperm selection," 13th International Symposium on Experimental Robotics (ISER), 2012.

- Book Chapters

1. **J. Liu,** D. G. Pyne, M. Abdelgawad, and Y. Sun, "Automated Vitrification of mammalian embryos on a digital microfluidic device," *Cryopreservation of Mammalian Gametes and Embryos: Methods and Protocols,* A. Agarwal, A. Varghese, Z. P. Nagy Ed., Humana Press, 2017, pp. 309-316.

2. **J. Liu,** Z. Lu, C. Leung, and Y. Sun, "Quantitative Analysis of Locomotive Behavior of Human Sperm Head and Tail," in *Springer Tracts in Advanced Robotics*, V. K. Jaydev P. Desai, Gregory Dudek, Oussama Khatib, Ed. Springer International Publishing Switzerland, 2013, pp. 603–616.

3. **J. Liu,** C. Leung, Z. Lu, and Y. Sun, "Human Sperm Tracking, Analysis, and Manipulation," *in Smart Materials-Based Actuators at the Micro/Nano-Scale*, M. Rakotondrabe, Ed. Springer New York, 2013, pp. 251–264.

4. M. D. Fridman, J. Liu, Y. Sun, and R. M. Hamilton, "Microinjection Technique for Assessment of Gap Junction Function," in *Methods in Molecular Biology*, M. Vinken and S. R. Johnstone, Eds. Springer New York, 2016, pp. 145–154.

- Patents

   1. **Jun Liu,** Bobak Mosadegh, Simon Dunham, James K. Min, "System and methods for augmented reality assisted cardiac interventions", invention disclosure filed through Weill Cornell Medicine, Cornell University (Application No. 2018/8094).

   2. Yu Sun, **Jun Liu**, Wesley Johnson, Changsheng Dai, "A Flexure-guided Piezo Drill with Large Axial Vibration and Small Lateral Vibration", invention disclosure filed through University of Toronto (Application No. 2017/10003376).

   3. Yu Sun and **Jun Liu,** "System and methods for automated vitrification of biological materials," invention disclosure filed through University of Toronto, Jul 30, 2014. US Provisional patent filed on July 30, 2014 (Application no. US14/447,245, PCT/CA2015/050722).

   4. Yu Sun, Ji Ge, Zheng Gong, **Jun Liu**, John Nguyen, Jun Chen, Chen Wang, "System and method for fetal and maternal red blood cell counting," invention disclosure filed through University of Toronto, Sept. 11, 2014. (Application US 14/422,291, PCT/CA2013/050685).

INVITED TALKS

- "Multi-scale robotic and automated systems for advanced healthcare", Research Seminar, Department of Mechanical Engineering, University of Hong Kong, 11/2023.

- "Multi-scale robotic and automation for advanced healthcare", Research Seminar, Department of Mechanical Engineering, University of Toronto, 09/2023.

- "Multi-scale robotic systems for advanced healthcare", Research Seminar, Department of Mechanical and Aerospace Engineering, NC State University, 02/2019.

- "Multi-scale robotic systems for biological cell analysis and manipulation", Research Seminar, Department of Computer Science and Engineering, Nanyang Technological University, 11/2018

- "Multi-scale robotic systems for advanced healthcare", Research Seminar, Department of Mechanical Engineering, Stevens Institute of Technology, 02/2019.

- "Multi-scale robotic systems for advanced healthcare", Research Seminar, Department of Mechanical and Industrial Engineering, Louisiana State University, 02/2019.

- "Multi-scale robotic systems for advanced healthcare", Research Seminar, Department of Mechanical Engineering, City University of Hong Kong, 03/2019.

- "Multi-scale robotic systems for advanced healthcare", Research Seminar, Department of Mechanical Engineering and Materials Science, Duke University, 02/2018.

- "From Life Origins to the Heart: Medical Robotic Systems for Advanced healthcare", Research Seminar, Department of Biomedical Engineering, the Chinese University of Hong Kong, 11/2017.

- "Microrobotic systems for automated IVF applications", Research Seminar, Department of

Bioengineering, Stanford University, 05/2016

- "Microrobotic systems for biological cell analysis and manipulation", Research Seminar, Department of Electrical and Computer Engineering, Michigan State University, 03/2016

- "Robotic Micromanipulation of Biological Cells", Research Seminar, Department of Mechanical Engineering, University of South Florida, 02/2016

TEACHING EXPERIENCE

2019-now	MNE 3058 *Embedded Control System*, City University of Hong Kong
2019-now	MNE 6005 *Micro System Technology*, City University of Hong Kong
2019-now	MNE 6126 *Sensors for Robot, AI and Control Systems*, City University of Hong Kong
2019-now	MNE 3123 *Internship in Engineering*, City University of Hong Kong
2011-2015:	APS106 -- *Fundamentals of Computer Programming,* University of Toronto
2012-2015:	MIE342 -- *Circuits with App. to Mechanical Eng. Sys.* University of Toronto
2012-2015:	MIE506 -- *MEMS Design and Microfabrication,* University of Toronto

STUDENT SUPERVISION

Year	Student Name	Topic
2022-2026	Meilu ZHU (PHD)	"AI for advanced healthcare"
2021-2025	Wenlong WU (PHD)	"Novel soft sensors for HMI"
2021-2025	Wei DAI (PHD)	"Microrobotic manipulation"
2021-2015	Tianyi WU (PHD)	"AR guided intervention"
2020-2024	Rui LIU (PHD)	"Soft Medical Robotics"
2020-2024	Min WANG (PHD)	"Magnetic Tracking and Control"
06/2017 – 09/2017	Jerry Wu	"Soft robotic oscillator design and fabrication"
04/2014 - 09/2014	Paul Xu	"Cancer cell contractility imaging"
04/2013 - 09/2013	Matthew Ng	"Electrical measurement of single bacteria"
05/2012 - 04/2013	Zongyi Yang	"Automated cell counting system"
04/2012 - 09/2012	Justin Wee	"Imaging processing for chip reading"
09/2011 - 04/2012	Kathryn Tang	"Mechanism design for cell manipulation"
09/2011 - 04/2012	John Nguyen	"Rotational stage control for cell manipulation"

PROFESSIONAL ACTIVITIES

- Associate Editor of IEEE Robotics and Automation Letters, 2021-2025
- Associate Editor of IEEE CASE 2024
- Associate Editor of IEEE ICRA 2024
- Associate Editor for IEEE ICUR (International Conference on Ubiquitous Robots) 2020
- Guest Editor, Frontiers in Robotics and AI
- Organizing Chair of IEEE International Conferences on Robotics and Biomimetics, Bankok, Thailand, 2024
- Finance Chair of IEEE International Conference on Advances Robotics and its Social Impact, Hong Kong, 2024
- Junior Program Committee member of IEEE ICRA2024, Yokohama, Japan
- Video Committee Chair and Program Committee Member of ICRA2021

- Program Committee Member for MARSS conference
- Award Committee Member for IEEE ROBIO (International Conference on Robotics and Biomimetics) 2019
- Treasurer, IEEE Robotics and Automation Society Hong Kong Chapter

Reviewer for journals and international conferences:

- IEEE Transactions on Robotics

- IEEE Transactions on Biomedical Engineering

- IEEE Transactions on Medical Imaging

- IEEE Journal of Biomedical and Health Informatics

- Journal of Micromechanics and Microengineering

-Scientific Reports

- Small

- ACS Nano

- Micromachines

- PLoS ONE

- IEEE International Conference on Robotics and Automation
- IEEE International Conference on Intelligent Robots
- IEEE International Conference on Biomedical Robotics and Biomechatronics
- IEEE International Conference on Mechatronics and Automation
- IEEE International Conference on Information and Automation
- World Congress on Intelligent Control and Automation

Committee and Volunteering Activities

- Department Staff Committee
- Student Exchange Coordinator
- Student Internship Coordinator
- Grand Challenges Scholars Program Committee

PROFESSIONAL SOCIETIES

- Member of the IEEE (Institute of Electrical and Electronic Engineers)
- Member of the IEEE RAS (Robotics and Automation Society)
- Member of the ASME (American Society of Mechanical Engineers)
- Member of the BMES (Biomedical Engineering Society)

REFERENCES: Available upon request.