



Yajing SHEN Dr. Eng.

Assistant Professor

AC1-Y6720,

Department of Mechanical and Biomedical Engineering

City University of Hong Kong

Tat Chee Avenue, Kowloon Tong, Kowloon, Hong Kong,
China

Tel: +852-3442-2045 Fax: +852-3442-0172

Email: yajishen@cityu.edu.hk Web: www.shenlab.info

Short Bio:

Dr. Yajing Shen received the PhD degree in 2012 from Fukuda Lab., Nagoya University, Japan, and he is working as Assistant Professor in Mechanical and Biomedical Engineering Department in City University of Hong Kong currently. His mainly research interest is micro/nanorobotics, including the micro/nano robots development and their applications in the fundamental and practical problems in biomedical, material, and other emerging fields. He has published ~100 papers in international journal/conference, and received several awards, including the Best Manipulation Paper Award in IEEE International Conference on Robotics and Automation (ICRA) in 2011, the IEEE Robotics and Automation Society Japan Chapter Young Award in 2011, and the Early Career Awards of Hong Kong UGC in 2014. He is Member of IEEE and an Executive member of China Micro-nano Robotic Society, and is very active in promoting micro/nano robotics to society, such as by serving as the committee member of international conference, organizing “micro/nano robot” workshop, special issue, and so on.

Research Interests:

Micro-nano robot, Micro-nano manipulation, Micro-nano robot control.

Academic Qualifications:

Assistant professor Dept. of Mechanical and Biomedical Engineering, City University of Hong Kong, Hong Kong (2013-present)

Postdoctoral Micro-Nano Systems Engineering Nagoya University, Japan (2012-13)

Ph.D. Micro-Nano Systems Engineering Nagoya University, Japan (2008-12)

M.S. Mechanical Engineering Xi'an Jiaotong University, China (2005-08)

B.S. Mechanical Engineering Xi'an Jiaotong University, China (2001-05)

Journal:

- [1] H. Lu, W. Shang, H. Xie, **Y. Shen***, “Ultrahigh Precise Rotational Positioning under Microscope: Nanorobotic System, Modeling, Control and Applications,” *IEEE Transactions on Robotics*, accepted.
- [2] P. Wang, H. Lu, S. Shen, W. Shang, J. Wang, and **Y. Shen***, “Micro-robotic Manipulation at Time-varying Air-liquid Interface for High-precise Watch-hand Alignment”, *IEEE/ASME Transactions on Mechatronics*, doi: 10.1109/TMECH.2017.2765763, to appear.
- [3] D. Li, L. Yang, W. Shang, H. Lu, W. Wan, **Y. Shen***, “In-situ Bending and Recovery Characterization of

Hollow Glass Nanoneedle Based on Nanorobotic Manipulation”, *Journal of Micromechanics and Microengineering*, 2017.

- [4] C. Jiang, H. Lu, K. Cao, W. Wan, **Y. Shen***, and Y. Lu*, "In Situ SEM Torsion Test of Metallic Glass Microwires Based on Micro Robotic Manipulation," *Scanning*, vol. 2017, 2017.
- [5] C. Jiang, H. Lu, H. Zhang, **Y. Shen***, and Y. Lu*, "Recent Advances on In Situ SEM Mechanical and Electrical Characterization of Low-Dimensional Nanomaterials," *Scanning*, vol. 2017, 2017.
- [6] C. Hu, Q. Shi, L. Liu, U. Wejinya, Y. Hasegawa, and **Y. Shen***, "Robotics in Biomedical and Healthcare Engineering," *Journal of Healthcare Engineering*, vol. 2017, 2017.
- [7] M. Zhang, R. Peltier, M. Zhang, H. Lu, H. Bian, Y. Li, Z. Xu, **Y. Shen**, H. Sun, Z. Wang, "In situ reduction of silver nanoparticles on hybrid polydopamine-copper phosphate nanoflowers with enhanced antimicrobial activity”, *Journal of Materials Chemistry B*, 5, pp. 5311-5317, 2017.
- [8] W. Wan, H. Lu, S. Shen, and **Y. Shen***, "Effect of alignment angle on the alignment accuracy of a miniature rotation robot for microscopy imaging," *International Journal of Advanced Robotic Systems*, Article vol. 14, no. 3, 2017.
- [9] **Y. Shen***, W. Wan, H. Lu, T. Fukuda, and W. Shang, "Automatic Sample Alignment under Microscopy for 360° Imaging Based on the Nanorobotic Manipulation System," *IEEE Transactions on Robotics*, Article vol. 33, no. 1, pp. 220-226, 2017.
- [10] W. Shang, Y. Liu, W. Wan, C. Hu, Z. Liu, C. T. Wong, T. Fukuda, and **Y. Shen***, "Hybrid 3D printing and electrodeposition approach for controllable 3D alginate hydrogel formation," *Biofabrication*, Article vol. 9, no. 2, 2017.
- [11] W. Shang, D. Li, H. Lu, T. Fukuda, and **Y. Shen***, "Less-invasive non-embedded cell cutting by nanomanipulation and vibrating nanoknife," *Applied Physics Letters*, Article vol. 110, no. 4, 2017.
- [12] H. Lu, W. Shang, X. Wei, Z. Yang, T. Fukuda, and **Y. Shen***, "Nanorobotic System iTRo for Controllable 1D Micro/nano Material Twisting Test," *Scientific Reports*, Article vol. 7, no. 1, 2017.
- [13] Y. Liu, C. Wu, H. S. S. Lai, Y. T. Liu, W. J. Li, and **Y. Shen***, "Three-dimensional calcium alginate hydrogel assembly via tiopc-based light-induced controllable electrodeposition," *Micromachines*, Article vol. 8, no. 6, 2017.
- [14] W. Wan, H. Lu, V. Zhukova, M. Ipatov, A. Zhukov, and **Y. Shen***, "Surface defect detection of magnetic microwires by miniature rotatable robot inside SEM," *AIP Advances*, Article vol. 6, no. 9, 2016.
- [15] W. Shang, H. Lu, W. Wan, T. Fukuda, and **Y. Shen***, "Vision-based Nano Robotic System for High-throughput Non-embedded Cell Cutting," *Scientific Reports*, Article vol. 6, 2016.
- [16] C. Ru, X. Zhang, **Y. Shen**, and Y. Zhang, "Sensing and Intelligent Perception in Robotic Applications," *Journal of Sensors*, Editorial vol. 2016, 2016.
- [17] G. Dai, B. Wang, S. Xu, Y. Lu, and **Y. Shen***, "Side-to-Side Cold Welding for Controllable Nanogap Formation from "dumbbell" Ultrathin Gold Nanorods," *ACS Applied Materials and Interfaces*, Article vol. 8, no. 21, pp. 13506-13511, 2016.
- [18] G. Dai, W. Wan, Y. Zhao, Z. Wang, W. Li, P. Shi, and **Y. Shen***, "Controllable 3D alginate hydrogel patterning via visible-light induced electrodeposition," *Biofabrication*, Article vol. 8, no. 2, 2016.
- [19] Z. Zhang, W. Yu, Z. Shi, **Y. Shen**, D. Zhang, K. Li, and Z. Yang, "Phase transition experimental and theoretical study of micro power generator supplying source for CMOS chip based on ferroelectric ceramic nano-porous material," *Journal of Nanoscience and Nanotechnology*, Article vol. 15, no. 4, pp.

3098-3102, 2015.

- [20] Z. Zhang, Z. Shi, Z. Yang, Z. Xie, D. Zhang, D. Cai, K. Li, and **Y. Shen***, "Design, simulation and fabrication of triaxial mems high shock accelerometer," *Journal of Nanoscience and Nanotechnology*, Article vol. 15, no. 4, pp. 2952-2957, 2015.
- [21] Z. Yang, P. Wang, **Y. Shen**, T. Chen, L. Chen, Q. Huang, L. Sun, and T. Fukuda, "Dual-MWCNT probe thermal sensor assembly and evaluation based on nanorobotic manipulation inside a field-emission-scanning electron microscope," *International Journal of Advanced Robotic Systems*, Article vol. 12, 2015.
- [22] W. Wan, G. Dai, L. Zhang, and **Y. Shen***, "Paper-based electrodeposition chip for 3D alginate hydrogel formation," *Micromachines*, Article vol. 6, no. 10, pp. 1546-1559, 2015.
- [23] **Y. Shen***, Z. Zhang, and T. Fukuda, "Bending spring rate investigation of nanopipette for cell injection," *Nanotechnology*, Article vol. 26, no. 15, 2015, Art. no. 155702.
- [24] **Y. Shen***, W. Wan, L. Zhang, L. Yong, H. Lu, and W. Ding, "Multidirectional image sensing for microscopy based on a rotatable robot," *Sensors*, Article vol. 15, no. 12, pp. 31566-31580, 2015.
- [25] **Y. Shen***, M. Nakajima, Z. Zhang, and T. Fukuda, "Dynamic Force Characterization Microscopy Based on Integrated Nanorobotic AFM and SEM System for Detachment Process Study," *IEEE/ASME Transactions on Mechatronics*, Article vol. 20, no. 6, pp. 3009-3017, 2015, Art. no. 7114302.
- [26] **Y. Shen***, "Effect of the tip size on AFM cantilever based force sensor," *Journal of Sensors*, Article vol. 2015, 2015, Art. no. 926594.
- [27] **Y. Shen*** and T. Fukuda, "State of the art: micro-nanorobotic manipulation in single cell analysis," *Robotics and Biomimetics*, Article vol. 1, no. 1, 2014.
- [28] J. Bao, Z. Yang, M. Nakajima, **Y. Shen**, M. Takeuchi, Q. Huang, and T. Fukuda, "Self-actuating asymmetric platinum catalytic mobile nanorobot," *IEEE Transactions on Robotics*, Article vol. 30, no. 1, pp. 33-39, 2014, Art. no. 6680736.
- [29] **Y. Shen***, M. Nakajima, Z. Yang, H. Tajima, Z. Najdovski, M. Homma, and T. Fukuda, "Single cell stiffness measurement at various humidity conditions by nanomanipulation of a nano-needle," *Nanotechnology*, Article vol. 24, no. 14, 2013, Art. no. 145703.
- [30] C. Hu, C. Tercero, S. Ikeda, M. Nakajima, H. Tajima, **Y. Shen**, T. Fukuda, and F. Arai, "Biodegradable porous sheet-like scaffolds for soft-tissue engineering using a combined particulate leaching of salt particles and magnetic sugar particles," *Journal of Bioscience and Bioengineering*, Article vol. 116, no. 1, pp. 126-131, 2013.
- [31] **Y. Shen***, M. Nakajima, Z. Yang, S. Kojima, M. Homma, and T. Fukuda, "Design and characterization of nanoknife with buffering beam for insitu single-cell cutting," *Nanotechnology*, Article vol. 22, no. 30, 2011, Art. no. 305701. [**reported by CBC TV**]
- [32] **Y. Shen***, M. Nakajima, M. Ridzuan Ahmad, S. Kojima, M. Homma, and T. Fukuda, "Effect of ambient humidity on the strength of the adhesion force of single yeast cell inside environmental-SEM," *Ultramicroscopy*, Article vol. 111, no. 8, pp. 1176-1183, 2011.
- [33] **Y. Shen***, M. Nakajima, S. Kojima, M. Homma, M. Kojima, and T. Fukuda, "Single cell adhesion force measurement for cell viability identification using an AFM cantilever-based micro puffer," *Measurement Science and Technology*, Article vol. 22, no. 11, 2011, Art. no. 115802. [**reported by Institute of Physics (IOP), Eurekalert, AlphaGalileo, Sciencedaily, Spektrumdirekt in the title of "Scientists take up golf**

to prove long-standing theory of cell stickiness”]

- [34] **Y. Shen***, M. Nakajima, S. Kojima, M. Homma, and T. Fukuda, "Study of the time effect on the strength of cell-cell adhesion force by a novel nano-picker," *Biochemical and Biophysical Research Communications*, Article vol. 409, no. 2, pp. 160-165, 2011.
- [35] **Y. Shen***, M. R. Ahmad, M. Nakajima, S. Kojima, M. Homma, and T. Fukuda, "Evaluation of the single yeast cell's adhesion to ITO substrates with various surface energies via ESEM nanorobotic manipulation system," *IEEE Transactions on Nanobioscience*, Article vol. 10, no. 4, pp. 217-224, 2011, Art. no. 6126046.
- [36] T. Fukuda, M. Nakajima, M. R. Ahmad, **Y. Shen**, and M. Kojima, "Micro- and nanomechatronics," *IEEE Industrial Electronics Magazine*, Article vol. 4, no. 4, pp. 13-22, 2010, Art. no. 5663749.
- [37] W. Shang, S. Zhao, and **Y. Shen**, "Application of LSSVM optimized by genetic algorithm to modeling of switched reluctance motor," *Chinese Society of Electrical Engineering*, Article vol. 29, no. 12, pp. 65-69, 2009.
- [38] W. Shang, S. Zhao, **Y. Shen**, and Z. Qi, "A sliding mode flux-linkage controller with integral compensation for switched reluctance motor," *IEEE Transactions on Magnetics*, Article vol. 45, no. 9, pp. 3322-3328, 2009, Art. no. 5208597.
- [39] W. Shang, S. Zhao, and **Y. Shen**, "A flexible tolerance genetic algorithm for optimal problems with nonlinear equality constraints," *Advanced Engineering Informatics*, Article vol. 23, no. 3, pp. 253-264, 2009.
- [40] S. Zhao, **Y. Shen**, and W. Shang, "Hybrid method involving parameter sensitivity analysis and sequential optimization for mill housing," *Journal of Xi'an Jiaotong University*, Article vol. 42, no. 1, pp. 1-4+12, 2008.
- [41] W. Shang, S. Zhao, **Y. Shen**, and L. Shi, "Genetic algorithm and flexible tolerance algorithm hybridized for global optimization problems with multiple constraints," *Journal of Xi'an Jiaotong University*, Article vol. 41, no. 11, pp. 1267-1270, 2007.

International Conference:

- [1] W. Wan, Y. Liu, H. Lu, and **Y. Shen***, "Multi-directional Characterization for Pollen Tubes Based on a Nanorobotic Manipulation System," in *International Conference on Intelligent Robotics and Applications*, pp. 84-93, 2017.
- [2] Q. Liu, L. Duan, B. Zhang, X. Zhang, T. Sun, X. Li, C. Wang, Q. Shi, W. Shang, **Y. Shen**, Z. Lin, Z. Wu, W. Li, M. Fujie, "Development of a Control Algorithm for a Hybrid Structure Surgical Manipulator", *The 7th Annual IEEE International Conference on CYBER Technology in Automation, Control, and Intelligent Systems (IEEE-CYBER 2017)*, 2017.
- [3] T. Sun, C. Wang, L. Duan, Q. Liu, M. Li, Z. Lu, Q. Liu, W. Li, Y. Wang, **Y. Shen**, J. Long, Z. Wu, "Development of a New Rehabilitation Robot MKA-IV", *The 7th Annual IEEE International Conference on CYBER Technology in Automation, Control, and Intelligent Systems (IEEE-CYBER 2017)*, 2017.
- [4] Z. Zheng, C. Li, C. Wang, Q. Liu, L. Duan, T. Sun, Q. Shi, Z. Lin, **Y. Shen**, W. Shang, Z. Wu, "Development of a FES System for Hemiplegic Rehabilitation Based on Patient Healthy Limb's EMG Signal", *The 2017 2nd International Conference on Biomedical and Biological Engineering*.

2017.

- [5] Q. Liu, C. Chen, C. Wang, Q. Liu, L. Duan, T. Sun, Q. Shi, **Y. Shen**, W. Shang, W. Li, Z. Wu, "Development of a Mobile APP for the Operation Monitoring and Health Management System of a Steam Turbine", *2017 IEEE International Conference on Advanced Robotics and Mechatronics (ICARM 2017)*, 2017.
- [6] Y. Liu, W. Wan, H. S. Sam Lai, Y. Liu, W. Li, and **Y. Shen***, "Three-dimensional calcium alginate hydrogel patterning by using TiOPc-based controllable electrodeposition," in *IEEE International Conference on Nano/Molecular Medicine and Engineering, NANOMED*, 2017, pp. 73-77.
- [7] T. Sun, Q. Liu, W. Li, Z. Lu, H. Chen, P. Chen, Z. Lu, C. Wei, A. Hou, C. Wang, M. Li, Q. Liu, L. Duan, Z. Wu, and **Y. Shen**, "Hip, knee and ankle motion angle detection based on inertial sensor," in *2016 IEEE International Conference on Information and Automation, IEEE ICIA 2016*, pp. 1612-1617.
- [8] W. Li, T. Sun, C. Wang, L. Duan, Q. Liu, **Y. Shen**, Q. Shi, M. Li, Y. Wang, J. Long, J. Wei, and Z. Wu, "Development of a 3 freedom ankle robot to assist the rehabilitation training," in *2016 IEEE International Conference on Information and Automation, IEEE ICIA 2016*, pp. 1606-1611.
- [9] C. B. Wang, T. Y. Sun, L. H. Duan, Q. Q. Liu, Z. J. Lu, M. Li, P. F. Chen, C. D. Wei, A. H. Hou, **Y. Shen**, Q. H. Liu, J. Qin, W. G. Li, Q. Shi, Y. L. Wang, J. J. Long, J. J. Wei, M. Zecca, and Z. Z. Wu, "Gait motion analysis based on WB-4 sensor with quaternion algorithm," in *6th Annual IEEE International Conference on Cyber Technology in Automation, Control and Intelligent Systems, IEEE-CYBER 2016*, 2016, pp. 279-283.
- [10] C. Wang, Z. Lu, L. Duan, Q. Liu, T. Sun, Z. Lu, W. Li, M. Li, **Y. Shen**, Q. Shi, Y. Wang, J. Long, J. Wei, J. Qin, and Z. Wu, "Mechanism design of an ankle robot MKA-III for rehabilitation training," in *6th Annual IEEE International Conference on Cyber Technology in Automation, Control and Intelligent Systems, IEEE-CYBER 2016*, 2016, pp. 284-289.
- [11] T. Y. Sun, Z. L. Yu, C. B. Wang, L. H. Duan, Q. Q. Liu, Z. J. Lu, H. Q. Chen, R. X. Luo, M. Li, **Y. Shen**, J. Qin, J. J. Long, Y. L. Wang, J. J. Wei, W. G. Li, Q. Shi, and Z. Z. Wu, "Development of a new parallel mechanism with five degrees of freedom for ankle rehabilitation," in *6th Annual IEEE International Conference on Cyber Technology in Automation, Control and Intelligent Systems, IEEE-CYBER 2016*, 2016, pp. 296-301.
- [12] T. Sun, C. Wang, Q. Liu, Z. Lu, L. Duan, P. Chen, **Y. Shen**, M. Li, W. Li, Q. Liu, Q. Shi, Y. Wang, J. Qin, J. Wei, and Z. Wu, "Development of lower limb motion detection based on LPMS," in *2016 IEEE International Conference on Real-Time Computing and Robotics, RCAR 2016*, 2016, pp. 243-248.
- [13] S. Shen, C. Gao, Y. Zhao, H. Lu, **Y. Shen**, C. Wang, T. Sun, Q. Liu, Q. Shi, J. Long, Y. Wang, Z. Wu, J. Qin, W. Li, M. Zecca, and A. Takanishi, "Development of lower limb rehabilitation evaluation system based on virtual reality technology," in *2016 IEEE International Conference on Real-Time Computing and Robotics, RCAR 2016*, 2016, pp. 517-522.
- [14] Z. J. Lu, R. X. Luo, C. B. Wang, L. H. Duan, Q. Q. Liu, T. Y. Sun, H. Q. Chen, Z. L. Yu, M. Li, **Y. J. Shen**, J. J. Long, Y. L. Wang, J. J. Wei, W. G. Li, Q. Shi, J. Qin, and Z. Z. Wu, "Development of a robot MKW-II for hand and wrist rehabilitation training," in *6th Annual IEEE International Conference on Cyber Technology in Automation, Control and Intelligent Systems, IEEE-CYBER 2016*, 2016, pp. 302-307.
- [15] Z. Lu, C. Wang, L. Duan, Q. Liu, T. Sun, **Y. Shen**, Q. Shi, M. Li, Y. Wang, J. Long, J. Wei, W. Li, A.

- Takanishi, and Z. Wu, "Development of an ankle robot MKA-III for rehabilitation training," in *2016 IEEE International Conference on Real-Time Computing and Robotics, RCAR 2016*, 2016, pp. 523-527.
- [16] M. Li, C. Wang, Q. Liu, L. Duan, Z. Wu, T. Sun, Q. Liu, W. Li, Z. Lu, H. Chen, P. Chen, Z. Lu, C. Wei, A. Hou, and **Y. Shen**, "Lower limb motion analysis based on inertial sensor," in *ICARM 2016 - 2016 International Conference on Advanced Robotics and Mechatronics*, 2016, pp. 347-352.
- [17] C. Wang, Z. Lu, Y. Wang, M. Li, L. Duan, **Y. Shen**, J. Wei, Q. Shi, M. Zecca, W. Li, and Z. Wu, "Development of a rehabilitation robot for hand and wrist rehabilitation training," in *2015 IEEE International Conference on Information and Automation, ICIA 2015 - In conjunction with 2015 IEEE International Conference on Automation and Logistics*, 2015, pp. 106-111.
- [18] C. Wang, L. Duan, M. Li, Z. Lu, **Y. Shen**, J. Wei, Q. Shi, Y. Wang, M. Zecca, W. Li, and Z. Wu, "Development an arm robot to simulate the lead-pipe rigidity for medical education," in *2015 IEEE International Conference on Information and Automation, ICIA 2015 - In conjunction with 2015 IEEE International Conference on Automation and Logistics*, 2015, pp. 619-624.
- [19] W. Wan and **Y. Shen***, "Patterning alginate hydrogel through optically induced electrodes," in *2015 IEEE 10th International Conference on Nano/Micro Engineered and Molecular Systems, NEMS 2015*, 2015, pp. 617-618.
- [20] T. Sun, Z. Lu, C. Wang, L. Duan, **Y. Shen**, Q. Shi, J. Wei, Y. Wang, W. Li, J. Qin, and Z. Wu, "Mechanism design and control strategies of an ankle robot for rehabilitation training," in *2015 IEEE International Conference on Robotics and Biomimetics, IEEE-ROBIO 2015*, 2015, pp. 132-137.
- [21] **Y. Shen***, C. T. Wong, W. Wan, M. Nakajima, and T. Fukuda, "3D cell assembly via anode electrode manipulation," in *2015 IEEE International Conference on Cyber Technology in Automation, Control and Intelligent Systems, IEEE-CYBER 2015*, 2015, pp. 1138-1142.
- [22] **Y. Shen***, M. Nakajima, J. Huang, and T. Fukuda, "Study of the plasticizer effect of single yeast cell by nanorobotic manipulation system," in *Proceedings of the World Congress on Intelligent Control and Automation (WCICA)*, 2015, vol. 2015-March, pp. 1-6.
- [23] **Y. Shen***, "Effect of endeffector's contact area on single cell manipulation at small scale," in *2014 IEEE International Conference on Robotics and Biomimetics, IEEE ROBIO 2014*, 2014, pp. 719-723.
- [24] X. Cao, Z. Zhang, J. Jiang, W. Shang, and **Y. Shen**, "Application of XC164 in the active motor power detection," in *4th Annual IEEE International Conference on Cyber Technology in Automation, Control and Intelligent Systems, IEEE-CYBER 2014*, 2014, pp. 72-75.
- [25] Z. Yang, M. Nakajima, **Y. Shen**, T. Yue, S. Lining, Q. Huang, and T. Fukuda, "A carbon nanotube vibration gyroscope based on field emission," in *Proceedings of the IEEE Conference on Nanotechnology*, 2013, pp. 51-56.
- [26] Z. Yang, M. Nakajima, **Y. Shen**, P. Wang, C. Ru, Y. Zhang, L. Sun, and T. Fukuda, "Test of A CNT gyroscope based on field emission," in *IEEE International Conference on Nano/Molecular Medicine and Engineering, NANOMED*, 2013, pp. 59-62.
- [27] **Y. Shen***, M. Nakajima, Z. Yang, Q. Huang, and T. Fukuda, "Real-time measurement of the adhesion force by Hybrid System of ESEM and AFM Cantilever," in *Proceedings of the IEEE Conference on Nanotechnology*, 2013, pp. 325-328.
- [28] C. Hu, M. Nakajima, T. Yue, **Y. Shen**, T. Fukuda, F. Arai, and M. Seki, "Controlled patterning of magnetic hydrogel microfibers under magnetic tweezers," in *IEEE International Conference on*

Intelligent Robots and Systems, 2013, pp. 2059-2064.

- [29] C. Hu, M. Nakajima, H. Wang, T. Yue, **Y. Shen**, M. Takeuchi, Q. Huang, M. Seki, and T. Fukuda, "Magnetic manipulation for spatially patterned alginate hydrogel microfibers," in *Proceedings of the IEEE Conference on Nanotechnology*, 2013, pp. 529-534.
- [30] T. Yue, M. Nakajima, **Y. Shen**, H. Tajima, and T. Fukuda, "Fabrication and self-assembly of movable microstructures embedding cells with concentration control inside microfluidic devices," in *2012 International Symposium on Micro-NanoMechatronics and Human Science, MHS 2012*, 2012, pp. 169-174.
- [31] T. Yue, M. Nakajima, C. Hu, **Y. Shen**, H. Tajima, and T. Fukuda, "Fabrication and self-assembly of movable microstructures embedding cells inside microfluidic devices," in *Proceedings of the 16th International Conference on Miniaturized Systems for Chemistry and Life Sciences, MicroTAS 2012*, 2012, pp. 1153-1155.
- [32] Z. Yang, M. Nakajima, **Y. Shen**, and T. Fukuda, "Nano-gyroscope assembly using carbon nanotube based on nanorobotic manipulation," in *2011 Int. Symp. on Micro-NanoMechatronics and Human Science, Symp. on "COE for Education and Research of Micro-Nano Mechatronics", Symposium on "Hyper Bio Assembler for 3D Cellular System Innovation"*, 2012, pp. 309-314.
- [33] Z. Yang, M. Nakajima, **Y. Shen**, and T. Fukuda, "Assembly and evaluation of MWCNTs probe thermal sensor by nanorobotic manipulation," in *Proceedings of the IEEE Conference on Nanotechnology*, 2012.
- [34] Z. Yang, M. Nakajima, **Y. Shen**, and T. Fukuda, "Nano-gyroscope device using field emission of isolated carbon nanotube," in *2012 International Symposium on Micro-NanoMechatronics and Human Science, MHS 2012*, 2012, pp. 256-261.
- [35] **Y. Shen***, M. Nakajima, Z. Yang, M. Homma, and T. Fukuda, "Nano needle with buffering beam for single cell stiffness measurement by nanorobotic manipulators inside ESEM," in *Proceedings of the IEEE Conference on Nanotechnology*, 2012.
- [36] **Y. Shen***, M. Nakajima, Z. Najdovski, Z. Yang, M. Kojima, S. Kojima, M. Homma, and T. Fukuda, "Method to study the single cell's time-variation adhesion strength during the manipulation inside ESEM," in *2011 Int. Symp. on Micro-NanoMechatronics and Human Science, Symp. on "COE for Education and Research of Micro-Nano Mechatronics", Symposium on "Hyper Bio Assembler for 3D Cellular System Innovation"*, 2012, pp. 210-215.
- [37] **Y. Shen***, M. Nakajima, C. Hu, T. Yue, H. Tajima, and T. Fukuda, "3D cell assembly based on electro deposition of calcium alginate," in *2012 International Symposium on Micro-NanoMechatronics and Human Science, MHS 2012*, 2012, pp. 249-252.
- [38] **Y. Shen***, M. Nakajima, M. Homma, and T. Fukuda, "Auto nanomanipulation system for single cell mechanical property characterization inside an environmental SEM," in *IEEE International Conference on Intelligent Robots and Systems*, 2012, pp. 646-651.
- [39] **Y. Shen***, M. Nakajima, P. Di, T. Yue, S. Kojima, M. Homma, and T. Fukuda, "Development of the auto manipulation system towards the single cell automatic analysis inside an environmental SEM," in *Proceedings - IEEE International Conference on Robotics and Automation*, 2012, pp. 4594-4599.
- [40] M. Nakajima, H. Hida, **Y. Shen**, M. Kojima, K. Sato, and T. Fukuda, "Multi-slicing of *C. elegans* tissue using micro-nanocutting probe based on nanomanipulation," in *Proceedings of the IEEE Conference on Nanotechnology*, 2012.

- [41] C. Hu, M. Nakajima, T. Yue, **Y. Shen**, and T. Fukuda, "Fabrication and evaluation of magnetic hydrogel fiber based on micro fluidic device," in *2012 International Symposium on Micro-NanoMechatronics and Human Science, MHS 2012*, 2012, pp. 393-398.
- [42] T. Fukuda, M. Nakajima, H. Tajima, **Y. Shen**, and T. Yue, "Micro-nanomanipulation system toward biological cell analysis and assembly," in *Proceedings of the 2012 1st International Conference on Innovative Engineering Systems, ICIES 2012*, 2012, pp. 31-36.
- [43] J. Bao, M. Nakajima, Z. Yang, **Y. Shen**, H. Tajima, and T. Fukuda, "Geometry and surface morphology effects for Catalytic Nano-Mobile Robot," in *Proceedings of the IEEE Conference on Nanotechnology*, 2012.
- [44] J. Bao, M. Nakajima, Z. Yang, **Y. Shen**, H. Tajima, and T. Fukuda, "Evaluation and modeling of temperature effects for Catalytic Nano-mobile Robot," in *2012 International Symposium on Micro-NanoMechatronics and Human Science, MHS 2012*, 2012, pp. 221-224.
- [45] **Y. Shen***, M. Nakajima, Z. Yang, S. Kojima, M. Homma, M. Kojima, and T. Fukuda, "Evaluation of nanoknife's edge angle for single cell cutting by using nanorobotic manipulators inside ESEM," in *Proceedings of the IEEE Conference on Nanotechnology*, 2011, pp. 155-160.
- [46] **Y. Shen***, M. Nakajima, S. Kojima, M. Homma, Y. Ode, and T. Fukuda, "Characterization of oscillating nano knife for single cell cutting by nanorobotic manipulation system inside ESEM," in *Proceedings - IEEE International Conference on Robotics and Automation*, 2011, pp. 4133-4138. [**Best Manipulation Paper Award**]
- [47] **Y. Shen***, M. Nakajima, S. Kojima, M. Homma, and T. Fukuda, "Single cell adhesion force measurement for viability identification using nanorobotic manipulation system inside ESEM," in *NEMS 2011 - 6th IEEE International Conference on Nano/Micro Engineered and Molecular Systems*, 2011, pp. 944-947.
- [48] **Y. Shen***, M. Nakajima, S. Kojima, M. Homma, and T. Fukuda, "Nano knife fabrication and calibration for single cell cutting inside environmental SEM," in *2010 International Symposium on Micro-NanoMechatronics and Human Science: From Micro and Nano Scale Systems to Robotics and Mechatronics Systems, MHS 2010, Micro-Nano GCOE 2010, Bio-Manipulation 2010*, 2010, pp. 316-320.
- [49] **Y. Shen***, M. R. Ahmad, M. Nakajima, S. Kojima, M. Homma, and T. Fukuda, "Cell-cell adhesion force measurement using nano picker via nanorobotic manipulators inside ESEM," in *2010 10th IEEE Conference on Nanotechnology, NANO 2010*, 2010, pp. 870-874.
- [50] T. Fukuda, M. Nakajima, M. R. Ahmad, **Y. Shen**, K. Nogawa, and M. Kojima, "Robotic manipulation and control for micro and nano mechatronics," in *2010 10th IEEE Conference on Nanotechnology, NANO 2010*, 2010, pp. 111-114.
- [51] **Y. Shen***, M. Nakajima, M. R. Ahmad, S. Kojima, M. Homma, and T. Fukuda, "In-situ single cell manipulation via nanorobotic manipulation system inside E-SEM," in *20th Anniversary MHS 2009 and Micro-Nano Global COE - 2009 International Symposium on Micro-NanoMechatronics and Human Science*, 2009, pp. 432-437. [**Best Paper Award**]
- [52] **Y. Shen***, M. Nakajima, M. R. Ahmad, T. Fukuda, S. Kojima, and M. Homma, "Single cell penetration using nano-pipette by E-SEM nanorobotic manipulation system," in *2009 IEEE International Conference on Mechatronics and Automation, ICMA 2009*, 2009, pp. 1849-1854.

- [53] **Y. Shen***, M. Nakajima, M. R. Ahmad, T. Fukuda, S. Kojima, and M. Homma, "Single cell injection using nano pipette via nanorobotic manipulation system inside E-SEM," in *2009 9th IEEE Conference on Nanotechnology, IEEE NANO 2009*, 2009, pp. 518-521.
- [54] W. Shang, S. Zhao, and **Y. Shen**, "Adaptive PID controller based on online LSSVM identification," in *IEEE/ASME International Conference on Advanced Intelligent Mechatronics, AIM*, 2008, pp. 694-698.
- [55] W. Shang, S. Zhao, and **Y. Shen**, "Application of flexible tolerance genetic algorithm for optimum design of double-crank mechanism," in *2008 3rd IEEE Conference on Industrial Electronics and Applications, ICIEA 2008*, 2008, pp. 770-774.
- [56] W. Shang, S. Zhao, and **Y. Shen**, "Application of LSSVM with AGA optimizing parameters to nonlinear modeling of SRM," in *2008 3rd IEEE Conference on Industrial Electronics and Applications, ICIEA 2008*, 2008, pp. 775-780.

Book Chapters:

- [1] "In Situ Nanocharacterization of Yeast Cells using ESEM and FIB", *Advanced Microscopy in Mycology*, DOI:10.1007/978-3-319-22437-4_6.
- [2] "Nanomanipulation of Biocells", *Encyclopedia of Nanotechnology*, DOI:10.1007/978-94-007-6178-0_100931-1.

Patent:

- [1] "System and method for manipulating an object for imaging", **Yajing Shen**, Wenfeng Wan, Lijun Zhang, US Patent App. 14/972,318, 2015
- [2] "Substrate for a three-dimensional cell culture, its preparation and use", **Yajing Shen**, Gaole Dai, Wenfeng Wan, US Patent App. 14/966,094, 2015
- [3] "An in-situ twisting and imaging device for micro/nano material", **Yajing Shen**, Lijun Zhang, Wenfeng Wan, CN 201610079194.8.
- [4] "A high frequency fatigue test devices", **Yajing Shen**, Lijun Zhang, CN 201610079340.7.
- [5] "A laser based force sensing system for SEM", **Yajing Shen**, Wanfeng Shang, CN102564654B.

Academic Awards:

- [1] Early Career Award, by UGC (University Grants Committee) of Hong Kong (2014)
- [2] Best Manipulation Paper Award, In 2011 IEEE International Conference on Robotics and Automation (IEEE ICRA 2011)
- [3] Japan Chapter Young Award, IEEE Robotics and Automation Society, 2011
- [4] Best Paper Award, In 2009 International Symposium on Micro-Nano Mechatronics and Human Science (IEEE MHS 2009)

Professional Services:

- [1] Member of IEEE; Executive member of China Micro-nano Robotic Society; Executive member of China Micro-Nano Sensing Society.
- [2] Editor board of Micromachines, Sensors, Journal of Sensors, Microscopy Research, etc; Leading

Guest Editor of IEEE Trans. on Nanotechnology (SI: Micro-Nano robot).

- [3] Program chair of IEEE RCAR 2018; Program co-chair of IEEE Cyber 2017; Industry forum co-chair of IEEE Nano 2017; Committee member of IEEE NANO, 3M-NANO, MARSS, IEEE Cyber international conference, etc.
- [4] Reviewer for Sensors, IEEE Transactions on Nanotechnology, IEEE Transactions on Automation Science and Engineering, IEEE/ASME Transactions on Mechatronics, International conference(ICRA/IROS/Robio), etc.