**Haiyuan Li, Ph.D.**
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## Research field

**Surgical robot**: Flexible robot for endoscopic surgery, e.g. robotic thyroid surgery; Ultrasound guided robot, ultrasound and robot calibration, registration and planning control as well as robot design for prostate, liver.

**Modular robotics**: Self-assembling robot, swarm robot with mechanical; interconnection or autonomous docking; Self-reconfigurable robot.

**Robot hand and robot manipulation**: Reconfigurable robot hand; Grasp.

## Education

Ph.D. Mechanical Engineering, Beihang University, 2012-2016

Visiting Ph.D. Mechanical Engineering, Johns Hopkins University, 2014-2015

M.S. Mechanical Engineering, Beihang University, 2009-2012

B.S. Mechanical Engineering, Shandong University, 2005-2009

## Appointments

Associate Professor(Senior Eningeer), Mechanical Engineering, BUPT, 01/2019 - present

Senior Eningeer, China Aerospace Science and Industry Corp, 08/2018 - 01/2019

Eningeer, China Aerospace Science and Industry Corp, 08/2016 - 8/2018

## Selected Ongoing Projects

1. Research on Task Adaptive Control Methods of Modular Robots Integrating Self-assembly and Self-reconfiguration, National Natural Science Foundation of China (NSFC), 01/2021-12/2023
2. Key Technology Research and Platform Development of the Flexible Robotic Instruments for Head and Neck Surgery, National Key Research and Development Program of China, 11/2019 - 12/2021
3. Research and Development of Practical Multi-fingered Dexterous Hands for Service and Industry, National Key Research and Development Program of China, 12/2019 - 12/2022
4. Novel surgical robot for ENT, Hospital research funds, 10/2021-10/2022
5. Tele-operating Master Roboitcs, Enterprise research funds, 06/2019 - present
6. Modular Self-assembly Snake-like robot, Enterprise research funds, 09/2020 - present

7. Modular Soft Robot and Compliant Control, Fundamental Research Funds for the Central Universities, 01/2019 - 10/2020

**Publication**

1. Haiyuan Li, Linlin Cui, Yuxuan Qiu, Lutao Yan, Qinjian Zhang. System Design and Simulation Experiments of a Virtual Reality Based Tele-operated Surgical Robot System. The 2021 IEEE International Conference on Robotics and Biomimetics(IEEE), Sanya, China, December 6-10.

2. Wu Zhang, Haiyuan Li, Linlin Cui, Haiyang Li, Xiangyan Zhang, Shanxiang Fang, Qinjian Zhang. Research progress and development trend of surgical robot and surgical instrument arm. The international Journal of Medical Robotics and Computer Assisted Surgery, 7(5):e2309, July 6, 2021. doi: 10.1002/rcs.2309

3. Dai Xiaofeng, Li Haiyuan. Ning Meng. Plasma Robot Engineering: The Next Generation of Precision Disease Management. Annals of Biomedical Engineering, 49: 1593–1597, June 3, 2021.

4. Xiangyan Zhang, Haiyuan Li, Bin Zhang, Qinjian Zhang and Yingpeng Cai. Kinematics Analysis and Grasping Simulation of a Humanoid Underactuated Dexterous Hand. The 2021 IEEE International Conference on Robotics and Biomimetics(IEEE), Sanya, China, December 6-10, 2021.

5. Li, Haiyuan, Haoyu Wang, Linlin Cui, Jiake Li, Qi Wei, and Jiqiang Xia. Design and Experiments of a Compact Self-Assembling Mobile Modular Robot with Joint Actuation and Onboard Visual-Based Perception. Applied Sciences,2022, 12(6): 3050.

6. Fei Wang, Duanling Li, Haiyuan Li. Mechanism Design and Kinematic Analysis of a Robotic Modular Finger and Reconfigurable Hand. The 2021 IEEE International Conference on Robotics and Biomimetics(IEEE), Sanya, China, December 6-10, 2021.

7. Yuting Xie, Xiaowei Chi, Haiyuan Li, Fuwen Wang, Lutao Yan, Bin Zhang, and Qinjian Zhang. Coal and Gangue Recognition Method Based on Local Texture Classification Network for Robot Picking. Applied Sciences 11, no. 23: 11495, 2021.

8. Li Haiyuan, Liu Chang, Yan Lutao, Zhang Bin, Li Duanling, Zhang Qinjian. Research on Impendence Control of an Upper Limb Exoskeleton Robot and Joint Experiments. Journal of Mechanical Engineering, 2020, 56(19): 200-209.DOI: 10.3901/JME.2020.19.200

9. YanLutao, WangQi, LI Haiyuan, Li Duanling, Xia Jiqiang. Review of Continue Surgical Robot Actuated by SMA. Journal of Mechanical Engineering, 2021, 57(11): 138-152.

10. Yan Lutao, Wang Qi, Li Haiyuan, and Zhang Qinjian. Experimental investigation of a twisted string actuation for usage in active catheter. Int. J. Med. Robot. Comput. Assist. Surg., 16(6):1–10, Dec. 2020.

11. Jia Pu, Li Duanling, Li Haiyuan,Yan Xiaojie, and Ge Zhenghao. Structural Design and Configuration Analysis of Parallel Mechanism. Journal of Mechanical Engineering, 2020, 56(19): 92-102.

12. Ren Weizheng, Zhang Bin, Li Haiyuan. Time-Varying Lyapunov Functions for Tracking Control of Mechanical Systems with and without Frictions[J]. IEEE Access, IEEE, 8: 51510–51517, 2020.

13. Fang Wei, Yang Kui, Li Haiyuan. Propagation-based incremental triangulation for multiple views 3D reconstruction. Chinese Optics Letters, 2021, 19(2): 021101.

14. Zhang Ziqiang, Liao Jinnong, Zhao Jing, Liu Xingkun, Li Haiyuan. Design method of one-DOF bio-inspired mechanism based on layered constraint conditions. Journal of the Brazilian Society of Mechanical Sciences and Engineering, Springer Berlin Heidelberg, 42(9): 454, 2020.

15. Liu Chang, Li Haiyuan, and Zhang Qinjian. Configuration Comparison and Design of an Upper Limb Exoskeleton for Robot Teleoperation. Proceedings of IEEE International Conference on Mechatronics and Automation (ICMA), Tijian, China, 921–926, 2019.

16. Li Haiyuan, Wang Tianmiao, Gregory Chirikjian. Simultaneous Hand-Eye and Robot-World Calibration by Solving the AX=YB Problem without Correspondence. IEEE Robotics and Automation Letters, 1(1): 145-152, 2016.

17. Qianli Ma, Haiyuan Li, Gregory Chirikjian. New Probabilistic Approaches to the AX = XB Hand-Eye Calibration without Correspondence. Proceedings of IEEE Intl. Conf. on Robotics and Automation (ICRA), 4365-71, 2016.

18. Li Haiyuan, Wang Tianmiao, Wei Hongxing, and Meng Cai. Response Strategy to Environmental Cues for Modular Robots with Self-Assembly from Swarm to Articulated Robots. Journal of Intelligent & Robotic Systems, Springer Netherlands, 81(3-4): 359-376, 2016.

19. Wei Hongxing, Li Haiyuan, Guan Yong, and Li Youdong. A dynamics based two-stage path model for the docking navigation of a self-assembly modular robot (Sambot). Robotica, 34(7): 1517-1528, 2016.

20. Cai Meng, Weidong Xu, Haiyuan Li, Huan Zhang, and Dong Xu. A new design of cellular soft continuum manipulator based on beehive-inspired modular structure. International Journal of Advanced Robotic Systems, 14(3):172988141770738, 2017.

21. Li Haiyuan, Wei Hongxing, Xiao Jiangyang, and Wang Tianmiao. Co-evolution framework of swarm self-assembly robots. Neurocomputing, 148: 112-121, 2015.

22. Wang Tianmiao, Li Haiyuan, Meng Cai. Collective Grasping for Non-cooperative Objects using Modular Self-reconfigurable Robots. IEEE/RSJ Intl. Conf. on Intelligent Robots and Systems (IROS), German, 3296-3301, 2015.

23. Li Haiyuan, Wang Tianmiao, Gregory S. Chirikjian. Self-assembly Planning of a Shape by Regular Modular Robots. Intl. Conf. on Reconfigurable Mechanisms and Robots (REMAR), Beijing, China, 36: 867-877, 2015.

24. Meng Cai, Xu Weidong, Li Haiyuan, Wang Tianmiao. A Novel Soft Manipulator Based on Beehive Structure. IEEE/RSJ Intl. Conf. on Intelligent Robots and Systems (IROS), German, 2342-7, 2015.

25. Li Haiyuan, Wang Tianmiao, Meng Cai, Gao Zhenxi, Zhang Yani, Xu Weidong. Towards Continuum Robotics: A Preliminary Curve Fitting Approach for Modular Self-Reconfigurable Robots. IFToMM Asian Conference on Mechanism and Machine Science, 2014.

26. Wang Tianmiao, Li Haiyuan, and Meng Cai. Self-Assembling for Swarm Modular Robots Using MIMO Fuzzy Control [J]. Advances in Mechanical Engineering, Article ID 598647, 2013.

27. Wei Hongxing, Cui Yuanyang, Li Haiyuan, Tan Jindong. Kinematics and the Implementation of a Modular Caterpillar Robot in Trapezoidal Wave Locomotion [J]. International Journal of Advanced Robotic Systems, 10(1), 2013.

28. Wei Hongxing, Li Haiyuan, Tan Jindong, and Wang Tianmiao. Self-assembly Control and Experiments in Swarm Modular Robots [J]. Science China Series E: Technological Science, 55(3): 1118-1131, 2012.

29. Wei Hongxing, Li Haiyuan, Chen Youdong, and Tan Jindong. A General Framework Integrating Exploration, Self-assembly and Locomotion Control for Swarm Robots. IEEE Intl. Conf. on Robotics and Biomimetics (ROBIO), Phuket, Thailand, 871-876, 2011.

30. Wei Hongxing, Li Haiyuan, Chen Youdong, and Tan Jindong. Self-assembly and Locomotion of Diverse Structures for Swarm Robots on Adaption Application. IEEE Intl. Conf. on Robotics and Biomimetics (ROBIO), Phuket, Thailand, 2409-2410, 2011.

31. Wei Hongxing, Huang Yizhou, Li Haiyuan, and Tan Jindong. Simulation and Experiments of the Simultaneous Self-Assembly for Modular Swarm Robots. The Second Intl. Conf. on Swarm Intelligence (ICSI), 118-127, 2011.

32. Wei Hongxing, Cai Yingpeng, Li Haiyuan, Li Dezhong and Wang Tianmiao. Sambot: A self-assembly modular robot for swarm robot. IEEE Intl. Conf. on Robotics and Automation (ICRA), Alaska, USA, 66-71, 2010.

33. Wei Hongxing, Li Haiyuan and Wang Tianmiao. An Evolutionary Swarm Self-assembly Robot: from Concept to Prototype. IEEE Intl. Conf. on Robotics and Biomimetics (ROBIO), Tianjin, China, 104-109, 2010.

**Synergistic Activities**

*Strategic Alliance of Technology Innovation for Minimally Invasive Tumor Therapy*, Head and Neck Commitees, Commitee
*China Health Culture Association*, Medicine and Engineering Interdisciplinary Division, Permanent Commitee
*Chinese Association of Artificial Intelligence (CAAI)*, Member *China Association of Medical Equiment*, Remote Medicine and Information Technology Division, Member
*IEEE*, member

**Professional Activities (Selected)**
*Reviewer of Journals*:
Reviewer of IEEE Robotics and Automation Letter
Reviewer of Frontiers Robotics and AI
Reviewer of Robotica Reviewer
Reviewer of Journal of Intelligent and Robotic Systems
Reviewer of Robotics and Autonomous Systems
Reviewer of IEEE Access

*Reviewer of Conferences*:
Reviewer of ICRA 2022/2020
Reviewer of IROS 2022/2020/2019/2013
Reviewer of IEEE ARM 2020

TC of IEEE-CYBER 2022