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## INDIN 2023 Special Session on

# SS 06 - Learning-Based Design, Fabrication and Control for Autonomous Robotic Systems

organized by

**Principal Organizer:** Zhijian Hu ([zhijian.hu@ntu.edu.sg](mailto:zhijian.hu@ntu.edu.sg))

**Affiliation:** Nanyang Technological University, Singapore

**Photo and short bio:**



Dr. Zhijian Hu received the B. Eng degree in Electrical Engineering from Dalian Maritime University, Dalian, China, in 2015, the M. Eng degree in Control Engineering from Harbin Engineering University, Harbin, China, in 2017, and Ph. D. degree in Control Science and Engineering from Harbin Institute of Technology, Harbin, China, in 2022. He is currently a Research Fellow with the School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore. During September 2019 to October 2020, Dr. Hu was a visiting scholar with Carleton University, Ottawa, Canada. His research interests include model predictive control, fuzzy control, resilient control, and the applications in robotics and smart grids. He served as the Associate Editor of the 17th International Conference on Control, Automation, Robotics and Vision (ICARCV) 2022, and the PC member of the 8th IEEE International Smart Cities Conference (ISC2) 2022.

**Organizer 1:** Zhongmou Li ([zhongmou.li@manchester.ac.uk](mailto:zhongmou.li@manchester.ac.uk))

**Affiliation:** The University of Manchester, UK

**Photo and short bio:**



Dr. Zhongmou Li received his B.Eng degree in Detection, Guidance and Control from Northwestern Polytechnical University graduating from Honor College, Xi'an, China in 2013. Then, he obtained his M.Sc degree and Ph. D. degree in robotics from Ecole Centrale de Nantes, France in 2017 and 2021. He works as a postdoc researcher at the University of Manchester with research interests in aerial robots, aerial inspection, robot cooperation and swarm.

**Organizer 2: Jia Lu** (jlumech@hit.edu.cn)

**Affiliation:** Harbin Institute of Technology, China

**Photo and short bio:**



Dr. Jia Lu received the B. Eng degree in Energy and Resources Engineering from Peking University, China in 2015, M. Eng and Ph.D. degrees in Mechanical Engineering in 2017 and 2021, respectively, both from The University of Tokyo, Japan. He is currently an Associate Professor in Mechanical Engineering with Harbin Institute of Technology, China. His research interests include intelligent flexible sensors and actuators, energy harvesting technology, robotics and mechanics. He was the awardee of the Best Conference Paper Award (Second Place) in the 20th PowerMEMS in 2021, and the awardee of National Excellent Young Talents Program of China in 2022. He has been member of IEEE and JSME (Japanese Society of Mechanical Engineers) since 2019.

**Organizer 3: Renjie Ma** (renjiema@hit.edu.cn)

**Affiliation:** Harbin Institute of Technology, China

**Photo and short bio:**



Dr. Renjie Ma received the B. Eng degree in Automation from Hefei University of Technology, Hefei, China, in 2017 and the Ph. D. degree in Control Science and Engineering from Harbin Institute of Technology, Harbin, China, in 2022. He is currently an Assistant Professor in Mechanical Engineering with Harbin Institute of Technology. He was the awardee of National Scholarship for Postgraduates endowed by the Ministry of Education of P. R. China in 2020. His research interests include data-driven robust control, machine learning and optimization, and autonomous intelligent robots. He was the special session chair of IECON'2019, Lisbon, Portugal. He has been an active researcher with IES and has been a member of IEEE IES/ IEEE since 2019.

## Call for Papers

The prevalence of computation cores integrated with physical processes boosts the developments of autonomous intelligent robots, which are tangibly interacted with operational environments, humans and other robots as well as adapt to complex dynamical uncertainties leading to enormous potentials on targeted therapy and deep space exploration. Machine learning techniques steer the future innovations of smart structures, additive manufacturing, and intelligent sensing and control for autonomous robotics. On the one hand, the performance predictions and structure designs of robots could be refined by learning techniques. On the other hand, the cruces of capture, rotation and stretch of robot lie in deploying learning-oriented control strategies to endow the safety and resilience. Moreover, deploying flexible sensors and actuators of robots to fulfil the human-machine interaction also relies on learning techniques. Albeit these aspects have gained great achievements in recent years, there still exist open issues to be further explored. This special session focuses on (but not limited to) learning-based design, fabrication, and control for robotics. Both academic researchers and industrial practitioners are welcomed for technical submission including novel methods, discussions, and application experiments to this special session.

### Topics of interest include, but are not limited to:

1	Learning-based smart structures and metamaterials for robots
2	Learning-enhanced flexible devices and energy harvesting technologies
3	Learning-based visual localization and mapping for robots
4	Learning-based anomaly detection and life prediction for robots
5	Learning-based path planning and safe tracking for robots
6	Learning-based estimation and control for robots
7	Learning-based formal analysis and verification for robots
8	Learning-oriented microrobots and soft robots
9	Learning-oriented unmanned vehicles and transportation
10	Learning-oriented formation and cooperation control for robots
11	Other topics that are closely related to the scopes of the SS

**Submissions Procedure:** All the instructions for paper submission are included in the conference website <https://2023.ieee-indin.org/index.php>

### Deadlines:

Deadline for submission of papers:	<b>March 01, 2023</b>
Notification of acceptance of papers:	<b>April 15, 2023</b>
Final manuscripts due:	<b>June 05, 2023</b>

### IEEE IES Technical Committee Sponsoring the Special Session (if any):

Technical Committee: IES Data Driven Control and Monitoring