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ZHENG LI



**Principal Investigator**

Zheng Li



**Team members**

Tianle Pan, Wing Yin Ng, Jixu Li, Yehui Li, Chi To Chan, Wenci Xin



Research Progress Summary

In the past year, Zheng Li's team focused his research in intelligent flexible endoscope robot, magnetic anchored and guided endoscope (MAGS) robot, electromagnetically actuated soft-tethered (EAST) colonoscope robot and soft hand rehabilitation robot. These research yield publications in leading journals/conferences in the robotics field as listed in the report, as well as wide media coverage. The MAGS endoscope received the Bronze of International Exhibition of Inventions of Geneva and was showcased in the CUHK Innovation Day and the Hong Kong International Medical and Healthcare Fair. The EAST colonoscope robot received the Champion and Special Award of PCKKSCA and was exhibited during the InnoCarnival organised by Science Park. The soft hand rehabilitation robot received the support from TSSSU and TBF for technology transfer. The system showcased in the

Hong Kong International Medical and Healthcare Fair and the Asia Summit on Global Health held in Hong Kong Convention and Exhibition Centre. In terms of academic conferences and public forums, most of the conferences were held online due to the pandemic. His team joined the organisation of the EMedic summit and actively participated in the leading technical conferences, such as ICRA, IROS, ROBOSoft, etc. In terms of research collaboration, the team has deepened the collaboration with Johns Hopkins University, Imperial College London, and ETH Zurich under the multiscale medical robotics centre. Besides, the team also established the collaboration with Harbin Institute of Technology (Shenzhen) on soft robot research. Last but not least, Zheng's team will continue their collaboration with Monash University on the flexible endoscope robot development.

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## Research and Scholarship

### Research Awards and Recognitions

Member's Name	Details	
	Award	Organisation
Truman Cheng Zheng Li Calvin Ng Philip Chiu Joseph Sung	Bronze – International Exhibition of Inventions of Geneva 2021	International Exhibition of Inventions of Geneva
Yuehui Li Tianle Pan Wenci Xin	Champion - Prof. Charles K.Kao Student Creativity Awards	The Chinese University of Hong Kong
Yuehui Li Tianle Pan Wenci Xin	Special Award - Prof. Charles K.Kao Student Creativity Awards	The Chinese University of Hong Kong

### Academic Editorship

Member's Name	Details	
	Role	Journal
Zheng Li	Associate Editor	Robotics and Automation Letters
		International Conference on Robotics and Automation
		IEEE/RSJ International Conference on Intelligent Robots and Systems
		International Conference on Soft Robotics
	Topic Editor	Frontiers in Robotics and Artificial Intelligence

### Reviewer of Journal / Conference

Member's Name	Details	
	Role	Journal / Conference
Tianle Pan	Reviewer	RoBoSoft Conference
Yehui Li	Reviewer	Robotics and Automation Letters
Zheng Li	Reviewer	Soft Robotics
		IEEE Transactions on Robotics
		IEEE/ASME Transactions on Mechatronics
		Robotics and Automation Letters

Member's Name	Details	
	Role	Journal / Conference
Zheng Li	Reviewer	Journal of Mechanisms and Robotics
		Mechanism and Machine Theory
		IEEE Transactions on Medical Robotics and Bionics
		International Conference on Robotics and Automation
		IEEE/RSJ International Conference on Intelligent Robots and Systems
		International Conference on Soft Robotics

### Grants and Consultancy

Name	Project Title	Funding Source	Start Date (dd/mm/yyyy)	End Date (dd/mm/yyyy)	Amount (HK\$)
Zheng Li	Hopebotics Limited	Technology Start-up Support Scheme for Universities	01/04/2021	31/03/2022	400,000
	Hopebotics – Soft Wearable Robotic Hand for Stroke Rehabilitation	Technology and Business Development Fund	01/08/2021	31/07/2022	200,000
	Soft Robotic Exosuit for Lower Limb Rehabilitation	Innovation and Technology Support Programme	01/09/2021	31/08/2023	2,948,600

### Publications

#### A. Journal Papers

- Cheng T, Li W, Ng WY, Huang Y, Li J, Ng SH, Chiu PWY, Li Z. Deep learning assisted robotic magnetic anchored and guided endoscope for real-time instrument tracking. *IEEE Robotics and Automation Letters*. 2021;6(2):3979-3986. doi:10.1109/lra.2021.3066834.
- Pan TL, Lei MC, Ng WY, Li Z. Analytical modeling of the interaction between soft balloon-like actuators and soft tubular environment for gastrointestinal inspection. *Soft Robotics*. Published online June 18, 2021. doi:10.1089/soro.2020.0159. (Epub ahead of print)
- Li Y, Guo C, Xin W, Pan T, Li W, Chiu PWY, Li Z. Design and preliminary evaluation of an electromagnetically actuated soft-tethered colonoscope. *IEEE Transactions on Medical Robotics and Bionics*. 2021;3(2):402-413. doi:10.1109/tmrb.2021.3063844.
- Li W, Chiu PWY, Li Z. A novel neural approach to infinity-norm joint-velocity minimization of kinematically redundant robots under joint limits. *IEEE Transactions on Neural Networks and Learning Systems*. Published online 2021. doi:10.1109/tnnls.2021.30. (Epub ahead of print)