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DEPARTMENT OF CIVIL ENGINEERING

SEMINAR

Innovations in Construction Robots: Pioneering Intelligent Equipment for Future Construction

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Date: May 07, 2025 (Wednesday)
Time: 2:00 p.m. to 3:00 p.m.
Venue: Room 612B, 6/F Haking Wong Building, The University of Hong Kong

Abstract
In building construction, intelligent construction equipment represented by robots is a crucial direction for future industrial development and a competitive edge. Construction is a vital indicator of human civilization's progress, with tools and equipment significantly influencing its future trajectory. Just as Lu Ban's inventions, such as the chisel and saw, facilitated the development of mortise-and-tenon structures and liberated craftsmen from arduous labor, thus exponentially increasing productivity, the last century has seen significant changes in construction scale both in China and the world. However, as a pillar industry of a country, the aging of construction practitioners, the long-term backwardness of equipment and automation, and the high labor intensity and risk for workers have gradually become increasingly worrying issues in recent years. This raises the question: What will future construction equipment look like? From the application perspective, this seminar categorizes construction robots into design, construction, demolition, and operation and maintenance, aiming to explore the diverse roles these robots can play in the construction field. Furthermore, given the four key technological challenges construction robots face: process automation, lightweight design, collaborative intelligence, and construction information technology, this seminar will present the efforts and initiatives undertaken by our research team to achieve relevant scientific objectives. Finally, I will focus on one of the team's flagship robots during my doctoral studies, the Bionic Hexapod Construction Robot (BHCR-I), discussing its development progress and applications.

About the Speaker
Dr. Shijie Wang is set to join Hebei University of Science and Technology as a lecturer (University-Appointed Associate Professor) in the School of Mechanical Engineering, China. His research encompasses construction robots, human-robot collaboration, high-speed heavy-duty parallel robots, and industrial robots. Dr. Wang previously worked as an R&D engineer at Shinetek Instruments Research Institute (Beijing) in 2016 and as a chief process engineer at Beijing Jingdiao Group Co., Ltd. in 2017. As a joint Ph.D. graduate from Hebei University of Technology and the Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences, he led the design and development of the world's first Bionic Hexapod Construction Robot (BHCR-I). He has published 7 SCI/EI papers, applied for 22 international PCT and Chinese invention patents, and received 2 academic awards. As a core member, he contributed to 6 national and provincial research projects, including the National Key R&D Program from the Ministry of Science and Technology of China, the National Natural Science Foundation of China (key program), the Shenzhen International Cooperation Research Program (China-Korea), and various provincial initiatives. He also facilitated 3 applied engineering projects for industry-academia collaboration, led 2 university-level research projects, and presided over a project shortlisted for the Guangdong-Hong Kong-Macao Greater Bay Area Doctoral and Postdoctoral Innovation and Entrepreneurship Competition. Additionally, Dr. Wang serves as a reviewer for several prestigious journals, including the Journal of Mechanisms and Robotics (ASME) and Automation in Construction (ELSEVIER), and has been reviewed for multiple international academic conferences. In the field of intelligent construction, he has gained extensive experience in research platform development and successfully assisted in applying for one collaborative innovation center in Hebei, one key laboratory in Guangdong, one key laboratory in Shenzhen, and one international joint research center in Guangdong.

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