



SEMINAR

Enhancing Soft Robot Performance through Smart Structural Design: Origami Modularity and Musculoskeletal Actuation

Date: March 26, 2026 (Thursday)

Time: 10:00 a.m.

Venue: Room 7-34 & 7-35
Haking Wong Building
HKU

Speaker: Dr. Hongying Zhang
Lecturer
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Abstract:

Soft robots are intrinsically suited for AI integration, offering safe, compliant interaction with humans. Yet their performance is limited by a lack of standardization and mechanical performance. This seminar presents two complementary approaches to address these barriers: (1) origami-based soft actuators that enable LEGO-like modular assembly and accelerate the standardized development of functional soft robots, and (2) compact musculoskeletal systems composed of large arrays of 3D printed soft artificial muscles that mirror human anatomy and substantially increase payload. The seminar will also highlight the reconfigurability, ultralight weight, and high deploy-to-store ratios of origami structures, including a shape-changing robot for ground coverage, a deployable antenna with 29.1 dBi gain, and an ultralight metamaterial capable of supporting more than 2,700 times its own weight. Collectively, these advances aim to inspire new designs in soft robotics, enhance mechanical performance, and broaden real-world applicability across industry and healthcare.

Biography:

Dr. Zhang Hongying is a lecturer in the Department of Mechanical Engineering at the National University of Singapore (NUS). She completed her Ph.D. in Mechanical Engineering at NUS in 2018. Following her doctoral studies, she served as a postdoctoral researcher at École Polytechnique Fédérale de Lausanne (EPFL) from 2018 to 2020, sponsored by Facebook Oculus II. Dr. Zhang's research focuses on the innovative design, modeling, actuation, and fabrication of smart soft robotic systems, emphasizing the integration of mechanical and machine intelligence to develop compact soft robotic systems. She has published more than 33 journal and conference papers, with 40% of her publications appearing in SJR Q1 journals. Her work has been awarded multiple grant fundings totalling SGD 2.1 million, including MOE AcRF Tier 2, MOE AcRF Tier 1, ASTAR YIRG, T-Lab Seed, CDE Teaching Transformation Grant, etc, underscoring her contributions and potential in the field of soft robots and origami engineering.

ALL INTERESTED ARE WELCOME

For further information, please contact Prof. Mingxin Huang at 3917 7906.