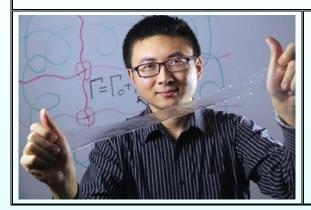**The Chinese University of Hong Kong**

Department of Biomedical Engineering

Time: 10:00 – 11:30 am, 27 June 2019 (Thursday)
Venue: Room 215, William M.W. Mong Engineering Building

Merging Humans and Machines via Soft Materials Technology

Prof. ZHAO Xuanhe

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Massachusetts Institute of Technology

Abstract

While human tissues and organs are mostly soft, wet and bioactive; machines are commonly hard, dry and biologically inert. Bridging human-machine interfaces is of imminent importance in addressing grand societal challenges in health, security, sustainability, education and joy of living. However, interfacing human and machines is extremely challenging due to their fundamentally contradictory properties. At MIT Zhao Lab, we exploit soft materials technology to form long-term, high-efficacy, compatible and seamless bridges and convergence between humans and machines. In this talk, I will first discuss the mechanics to design extreme properties for soft materials, including extremely tough, resilient, adhesive, strong and fatigue-resistant, which are critical for reliable human-machine interfaces. Then I will discuss a set of soft materials technology including i). hydrogel bioelectronics capable of electro-opto-fluidic interrogating single neurons and continuously monitoring gastric physiological conditions over the long term; ii). tissue double-sided tapes that give instant strong adhesion of wet tissues and devices; iii). ferromagnetic soft robots capable of minimally invasive surgery for previously inaccessible lesions. I will conclude the talk with a perspective on future human-machine convergence enabled by soft materials technology.

Biography

Dr. Zhao is an Associate Professor in Mechanical Engineering at MIT. The mission of Zhao Laboratory at MIT is to advance science and technology on the interfaces between humans and machines for addressing grand societal challenges in health, sustainability, security, education and joy of living; by integrating expertise in soft materials, solid mechanics, bioelectronics, 3D printing and theoretical modeling. Dr. Zhao is a recipient of the early career award and young investigator award from National Science Foundation, Office of Naval Research, Society of Engineering Science, American Vacuum Society, Adhesion Society, Materials Today, Journal of Applied Mechanics, and Extreme Mechanics Letters. He was a Clarivate Highly Cited Researcher in 2018. He held the Hunt Faculty Scholar at Duke, and the d'Arbeloff Career Development Chair and Noyce Career Development Professor at MIT. Dr. Zhao is an associate editor of Science Advances.

*** ALL ARE WELCOME ***

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