



**THE CHINESE UNIVERSITY OF HONG KONG
FACULTY OF MEDICINE
SCHOOL OF BIOMEDICAL SCIENCES**

SBS PI Seminar Series 2023-2024

Prof. CHEUNG Chi Kwan Vincent

Associate Professor
School of Biomedical Sciences, and
Gerald Choa Neuroscience Institute
Faculty of Medicine, The Chinese University of Hong Kong

will present a seminar entitled

“Motor Modularity as a Theory of Motor Control”

The mammalian motor system is a distributed, ultra-complex network that comprises the sensorimotor cortices, basal ganglia, thalamic and brainstem nuclei, cerebellum, and spinal interneuronal circuits. Neuroscientists have approached the “hard problem” of understanding movement by formulating theories of motor control. For any such theory to be useful, it must facilitate the tackling of the following questions. What are the neurophysiological and developmental origins of the control policy in the theory? Can the model account for motor skill learning? And how may the model guide development of neuro-rehabilitation for movement disorders? I argue that the theory of modular motor modularity – the idea that the motor system constructs movement by combining a limited number of discrete coordination modules called muscle synergies – is a viable theory of motor control. Recent findings from our lab and others have relied on motor modularity to shed light on all questions above. Specifically, muscle synergies are encoded by spinal interneuronal populations and accessible by the motor cortex. Both the robustness and plasticity of muscle synergies contribute to changes of motor patterns during motor development and motor learning. Finally, muscle synergies may serve as predictive markers and targets of intervention for personalized rehabilitation for stroke survivors.

6 June 2024, Thursday, 4:00 pm– 5:00 pm

Room G02, Lo Kwee-Seong Integrated Biomedical Sciences Building,
Area 39, The Chinese University of Hong Kong