



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

SBS PI Seminar Series 2022-2023

Prof. Cheung Chi Kwan Vincent

Associate Professor

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will present a seminar entitled

“The Neural Basis and Plasticity of Muscle Synergies”

Abstract: The hypothesis that motor behaviors are constructed by the central nervous system through the combination of muscle synergies – discrete neuromotor building blocks that coordinate groups of muscles spatiotemporally – has remained controversial, partly because many critical questions surrounding it have remained unresolved. Are muscle synergies identified from electromyographic data (EMG) neurophysiological entities or reflections of task constraints? If synergies have a neural basis, are they immutably hard-wired or modifiable during development and learning? Our recent data have shed light on both questions. For the first, optogenetically elicited activities of premotor interneurons in the murine lumbosacral spinal cord yielded spike-triggered averages of EMGs that were similar to the muscle synergies factorized from EMGs; also, direct stimulation of the exposed motor cortex of human patients undergoing tumor resection elicited muscle patterns that accounted for the patients’ behavioral muscle synergies. Thus, muscle synergies are structures with a neural origin. For the second question, EMGs collected from preschoolers and adults during running suggest that during child-to-adult development, muscle synergies fractionate into units with fewer muscles; but during motor training, increased energetic efficiency of running is associated with the merging of specific synergies. Thus, muscle synergies exhibit both developmental and learning-related plasticity. Overall, these new data argue that muscle synergies are neurophysiologically encoded modules whose structures at any moment reflect the individual’s history of sensorimotor experience.

30 March 2023, Thursday, 4:00 – 5:00 pm

On-site & via Zoom

G02, Lo Kwee-Seong Integrated Biomedical Sciences Building, Area 39, CUHK

Registration link

<https://webapp.sbs.cuhk.edu.hk/eform/view.php?id=103878>

Deadline: **12:00 noon, 29 March 2023 (Wed)**

