



**THE CHINESE UNIVERSITY OF HONG KONG**  
**Department of Electronic Engineering**  
**Seminar**



**Static Balancing of Mechanisms:  
Principles and Applications in Surgical and Rehabilitation Devices**

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**Date: 30 May 2025 (Friday)**

**Time: 9:30 a.m. – 10:20 a.m.**

**Place: Rm 418, Ho Sin Hang Engineering Building, CUHK**

**Abstract**

Static balancing plays a crucial role in the design of mechanical systems that enables systems to operate with minimal actuation effort and enhanced safety. This talk begins with an overview of the fundamental principles and common strategies used in static balancing of mechanisms. The focus then shifts to the practical application of these principles in the development of surgical and rehabilitation devices. Through selected case studies and examples, the talk illustrates how static balancing can improve the ergonomics and energy efficiency of assistive and medical technologies. Relevant design approaches and experimental outcomes from our recent research will also be presented, highlighting the potential of static balancing to advance human-centred engineering solutions.

**Biography**

Dr Chin-Hsing Kuo is a Senior Lecturer and Academic Program Director of Mechanical Engineering at the University of Wollongong, Australia. He previously served as an Associate Professor at the National Taiwan University of Science and Technology and holds a Ph.D. in Mechanical Engineering from King's College London. Dr. Kuo's research focuses on the design of mechanisms and robotic systems that optimize mechanical energy interactions, such as those involving springs, weights, and magnets, to enable next-generation technologies. His work advances new theories, methods, and design strategies in machine elements, mechanisms, and robotics, with particular emphasis on static balancing and magnet-enabled innovation.

Dr Kuo holds key leadership roles in prominent international engineering communities. He currently chairs both the ASME Mechanisms and Robotics Committee and the IFToMM Technical Committee for Linkages and Mechanical Controls. He serves or has served as an Associate Editor for several leading journals, including the *ASME Journal of Mechanisms and Robotics*, *Mechanism and Machine Theory*, and *IEEE Robotics and Automation Letters*. His past leadership roles include Conference Chair of the 2021 ASME Mechanisms and Robotics Conference at IDETC/CIE and General Chair of the 6th IFToMM International Symposium on Robotics and Mechatronics (ISRM 2019).

Dr Kuo is a Fellow of the American Society of Mechanical Engineers (ASME) and a former recipient of the prestigious JSPS International Research Fellowship.

**\*\*\* ALL ARE WELCOME \*\*\***

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