



SEMINAR

Understanding the interplay between baroreflex gain, low frequency oscillations, and pulsatility in the neural baroreflex

Date: 3rd September, 2026 (Thursday)

Time: 2:00 p.m.

Venue: Room 7-35
Haking Wong Building
HKU

Speaker: Professor John V. Ringwood
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Abstract:

The neural baroreflex consists of baroreceptors which sense mean arterial pressure (MAP), and actuators that can produce a change in MAP, such as the heart and parts of the peripheral resistance containing innervated smooth muscle. The brain is the controlling unit, maintaining an appropriate MAP, in spite of various disturbances. Under certain circumstances, including haemorrhage and other states of distress, the gain of the neural baroreflex can change, causing low frequency (LF) oscillations (sometimes termed Mayer waves) in blood pressure (BP). Though their purpose is unclear, the origins of these LF oscillations has previously been explained via a nonlinear feedback model, though focusing on the peripheral resistance as an MAP actuator only. The present study now includes analytical and simulation results explaining the LF oscillation phenomenon for the full neural baroreflex, containing both peripheral resistance (PR) and cardiac branches. However, the main contribution of the study is to examine the effect of blood pulsatility, or a lack of pulsatility, on the neural baroreflex, and how its effect can manifest in the presence of LF oscillations. This may have importance in cases where pulsatility is reduced (for example where left-ventricular assist devices are present), or completely absent (for example in turbine-based artificial hearts).

Biography:

John V. Ringwood received the BSc from Trinity College, Dublin, in 1981, and the Ph.D. degree in control systems from Strathclyde University in 1985. He was the Founding Head of the Department of Electronic Engineering, Maynooth University, Ireland, where he also served as the Dean of Engineering from 2001 to 2006, and is currently Chair Professor of Electronic Engineering and the Director of the Centre for Ocean Energy Research at Maynooth University. His research interests focus on control systems and their applications, including renewable energy systems (and wave energy in particular). Professor Ringwood is Associate Editor of *IEEE Transactions on Sustainable Energy*, the *Journal of Ocean Engineering and Marine Energy*, and is Deputy Subject Editor of *IET Renewable Power Generation*. He is a Fellow of Engineers Ireland, a Fellow of IEEE and a Fellow of the International Federation of Automatic Control (IFAC).

ALL INTERESTED ARE WELCOME

For further information, please contact Prof. Xiaofan Li at 3917 7904.