

Application of engineering models of the cardiovascular system in studies of high blood pressure

Joint Electrical Institutions Sydney - Engineers Australia, IEEE, IET



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DATE & TIME

Thursday, August 14, 2014
5:30 pm for 6:00 pm start

VENUE

Engineers Australia Harricks
Auditorium
Ground Floor, 8 Thomas Street,
Chatswood NSW 2067

COST

EA, IET, IEEE Members – Free
Students – Free
Non-members - \$30

CPD

Eligible for 1.5 Continuing
Professional Development hours.

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IEEE



The Knowledge Network

Presentation by Professor Alberto Avolio, Professor of Biomedical Engineering The Australian School of Advanced Medicine, Macquarie University



Blood circulation results from forces generated by the heart and as the heart output necessarily pulsates both pressure and flow velocity in vessels are pulsatile. This inherent oscillatory behaviour has led to development of haemodynamic models that are analogous to voltage and current behaviour in electrical circuits with lumped parameters or in distributed transmission lines. The field of blood flow in the circulatory system has benefited greatly from use of

such models to explore fundamental mechanisms in the relationship between heart function and blood vessels both in health and disease. The interaction between engineering and cardiovascular physiology will be described in terms of the progress made in the field of cardiovascular research. Specifically, the use of such models has led to novel ways of understanding the measurement of arterial blood pressure. The combination of the conventional brachial cuff with the non-invasive acquisition of the arterial pulse waveform has produced, for the first time, a means of obtaining pressure at the heart without the insertion of invasive catheters. This breakthrough has come from Australian research leading to the development of novel technology which is considered the 'gold standard' against which all other similar devices are benchmarked. The continued application of engineering models in cardiovascular research has the promise of enhancing the capacity to deal with one of the most severe but silent causes of mortality and morbidity: high blood pressure.

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SPEAKER BIOGRAPHY

Professor Alberto Avolio

Professor Avolio is Professor of Biomedical Engineering in The Australian School of Advanced Medicine at Macquarie University. He obtained his PhD in biomedical engineering from UNSW and has since acquired major international recognition in the research field of cardiovascular haemodynamics. He teaches in the fields of cardiovascular dynamics and in the broad area of engineering in medicine and biology and his current research areas include pulsatile relationships between blood pressure and flow, characterization of pressure-dependent indices of vascular function, cellular and molecular mechanisms of arterial stiffness, pulse wave analysis and non-invasive estimation of central aortic pressure, retinal vascular function and non-invasive assessment of cerebral dynamics, cerebral aneurysms, cardiovascular modelling and biological signal processing.

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