Optics & Photonics Group Lunchtime Seminar Series

University of Nottingham

Research and Innovation of Intelligent Healthcare Monitoring Technologies at Coventry University

Prof Dinchang Zheng
Coventry University

13:30 Wednesday 15 May 2024

Life Sciences Building - B3

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Dingchang Zheng

Research and Innovation of Intelligent Healthcare Monitoring Technologies at Coventry University

Professor Dingchang Zheng is the Director of the Research Centre for Intelligent Healthcare (CIH) at Coventry University Centre for Intelligent Healthcare. His talk will start with an overview of CIH's key research areas, including wearable and Wi-Fi healthcare sensing technologies, vascular optics and microvascular sensing, intelligent physiological signal processing and healthcare data analytics, fundamental advances in AI technologies and their applications in healthcare, digital self-management and health interventions. Next, he will share more detailed information into their journey of developing innovative blood pressure (BP) and arterial stiffness measurement techniques.

Innovative Technologies for Accurate and Reliable BP measurement: BPs are commonly measured non-invasively by manual auscultatory and automatic oscillometric method. However, it is still one of the most poorly performed diagnostic measurements in clinical practice. The importance of accurate BP measurement is without doubt in clinical practice, and small inaccuracies in BP measurement can have considerable consequences. This part of the talk will focus on the effect of physiological factors and measurement conditions on BP determination. In addition, various innovative cuff-based and cuff-less techniques being developed to achieve reliable and accurate measurements will be introduced.

Innovative Technology to Assess the Health of the Peripheral Artery: Arteries are naturally compliant but become stiff and less able to respond to different clinical and physiological changes. Poor compliance is an independent predictor of cardiovascular morbidity. A method for assessing the normal flexibility of arteries would therefore be of great value. Current non-invasive techniques, including ultrasound measurement, analysis of arterial pulse characteristics and measurement of pulse wave velocity, measure the compliance indirectly. However, as suggested by the UK national and international guideline bodies, there is currently no acceptable, reliable compliance technique for routine clinical use. This indicates an urgent need to develop alternatives. This part of the talk will introduce a novel and award-winning technique developed at Prof Zheng's group to measure accurately arterial elasticity (distensibility) with applied external cuff pressures around the arm. Next, its clinical effectiveness from various clinical validation studies will also be discussed.

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All are welcome

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