

IEEE Distinguished Lecturer Seminar

Wearable Respiratory Monitoring: Algorithms and System Design

By

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Date : 8 December 2011 (Thursday)

Time : 5:00 p.m. to 6:30 p.m. (Light refreshment starts at 4:45 p.m.)

Venue : CYC-603, The University of Hong Kong

ABSTRACT

More than 15% of the population suffers from some forms of respiratory disorders (e.g. Asthma, COPD, Obstructive Sleep Apnea, etc.) and some of these disorders can be acute. Currently, physicians perform such diagnosis by listening to lung sound using a stethoscope. The problem of this existing approach is that, the history of occurrence is important and yet patients' descriptions are often erroneous. Furthermore, auscultation with stethoscope is subjective and cannot be used for long-duration monitoring too. The emerging trend is therefore to monitor respiratory disorders in a home setting through the use of a wearable system.

This lecture will focus on presenting the findings generated from a joint research program undertaken by the lecturer and his engineering team at NTU and the physicians at the National University Hospital (Singapore). In particular, the monitoring of wheezes (which is one symptom of Asthma, COPD) will be discussed. In addition to presenting the typical characteristics of such signals, the lecture will also address the problems imposed by the wearable constraint and discuss the algorithms and system solutions to these problems. The development of algorithms and the associated circuits and systems has evolved through three generations of designs. The problems faced and the findings obtained for these designs will be shared at the lecture. A demonstration of the effectiveness of some of these techniques and designs will be given during the lecture too.

ABOUT THE SPEAKER

Associate Professor Wee Ser received his Ph.D. degree in Electrical and Electronic Engineering from Loughborough University, UK, in 1982. He joined the Defence Science Organization (DSO) in 1982 and became Head of the Communications Research Division in 1993. In 1996, he was appointed Technological Advisor to the CEO of DSO National Laboratories. In 1997, he joined the Nanyang Technological University (NTU) and was appointed Director of the Centre for Signal Processing. In 2011, Wee Ser was appointed the founding Director for the Centre of Excellence for Bio-Instrumentations, Devices, and Signal Processing.

Wee Ser is currently a Distinguished Lecturer for the IEEE Circuits and Systems Society. He is the associate editors for the IEEE Communications Letters and the Journal of Multidimensional Systems and Signal Processing (Springer). He is a senior IEEE member and a member of a TC in the IEEE Circuit and System Society. He has served in the RCM of ISCAS 2009 and ISCAS 2010, and as Chair of IEEE Signal Processing Chapter. He has served as a reviewer to international journals including the IEEE Transaction on Circuits and Systems, and as track chair of several international conferences. He has served in the International Advisory Committee of an IEEE Signal Processing Workshop on DSP and as a panel chair of an International DAB Symposium. More recently, he was invited as a keynote speaker for ICSIPA'09 (IEEE Conference of Signal and Image Processing Applications). He has also served in several national advisory and technical committees. He is a board director of a public listed company and an honour advisor to the Seattle Technology. He has published about 130 research papers in refereed international journals and conferences. He holds six patents and is a co-author of four book chapters. He is the Principal Investigator of several research projects (with about US\$2m of grants). Wee Ser was a recipient of the Colombo Plan scholarship and the PSC postgraduate scholarship. He was awarded the IEE Prize during his studies in UK. While in DSO, he was a recipient of the Defence Technology (Individual) Prize 1991 and the DSO Excellent Award 1992. His research interests include microphone array, wearable signal processing system design, and signal classification.

ALL ARE WELCOME