DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
Faculty of Engineering
Website: http://www.ece.nus.edu.sg

Area: Signal Analysis and Machine Intelligence

Host: Prof Li Haizhou

Jointly organized with
IEEE Systems, Man and Cybernetics Singapore Chapter
Chinese and Oriental Language Information Processing Society
Teochew Doctorate Society, Singapore

TOPIC	:	**Novel microphone arrays for processing speech sound scenes: co-incident arrays, ad-hoc arrays and co-prime arrays**
SPEAKER	:	**Professor Christian Ritz,** **University of Wollongong**
DATE	:	**12 April 2019, Friday**
TIME	:	**10am to 11.30am**
VENUE	:	**E5-03-20, Engineering Block E5, Faculty of Engineering, NUS**

ABSTRACT

This lecture will describe research into the use of novel microphone arrays for multichannel processing of recorded speech sound scenes for applications such as direction of arrival estimation, source separation and enhancement. Co-incident microphone arrays are formed from two or more microphones placed at the same physical location and this lecture will focus on co-incident microphone arrays based on the acoustic vector sensor and the B-format array design. These designs allow for the creation of very small arrays compared to traditional designs, such as Uniform Linear Arrays (ULAs), which rely on spatially separated microphones. Ad-hoc arrays, formed from microphones distributed throughout a room at unknown locations, allow for the flexible creation of arrays covering a large area but require approaches that do not rely on knowledge of the array geometry. Co-prime arrays are formed from multiple sub-arrays interleaved in such a way that joint processing can overcome spatial aliasing caused by having too few microphones to meet the Nyquist sampling limit. The lecture will highlight key challenges associated with each of these types of microphone arrays as well as suggestions for future research.

BIOGRAPHY

Christian graduated with a Bachelor of Electrical Engineering and a Bachelor of Mathematics (both in 1999) and a PhD in Electrical Engineering (in 2003) all from the University of Wollongong (UOW), Australia. His PhD research focused on very low bit rate coding of wideband speech signals. Since 2003, Christian has held a position within the School of Electrical, Computer and Telecommunications Engineering at UOW where he is currently a Professor. Concurrently, he is also the Associate Dean (International) for UOW's Faculty of Engineering and Information Sciences, with responsibility for managing the Faculty's international strategy including significant transnational programs and partnerships in China, Hong Kong, Dubai, Singapore and Malaysia. Christian is the deputy director of the Centre for Signal and Information Processing (CSIP) and leads the audio, speech and acoustics signal processing research of the centre. He is actively involved in several projects, some funded from the Australian government and industry, including microphone array signal processing for the directional sound enhancement, acoustic scene classification, loudspeaker-based sound field reproduction and control and visual object classification using machine learning. He is currently a Distinguished Lecturer (2019 to 2020) of the Asia Pacific Signal and Information Processing Association (APSIPA). For more information see: https://scholars.uow.edu.au/display/christian_ritz.

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