

学术报告会

时间：2017年3月31日(周五)13:00

地点：电院群楼2-406会议室

Fibre Optical Sensors for Medicine and Stretchable Sensors for Soft Robotics

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Abstract:

This seminar consists of two parts: two fibre optical needle-tip sensing techniques for medical applications and two stretchable sensing techniques for soft robotic applications.

First, I will present two novel fibre optics based needle-tip sensing techniques for in vivo biopsy and minimally invasive spinal surgeries (MISS). The first sensor uses the Fabry-Perot Interference (FPI) for the needle-tip tactile sensing and identification of type of tissues. The optical circuit, signal processing and temperature compensation are discussed, and the experimental setup and results with phantom and bovine tissues are presented. The second sensor uses Raman spectroscopy for in vivo nerve detection. The sensing principle and the design of miniaturised Raman probe are discussed, the algorithm for classification of Raman signatures is given, and preliminary experimental results are presented.

Second, I will present two stretchable sensors for soft-bodied robotic applications, (1) Nanocomposite-Based Stretchable Deformation Sensor and (2) Stretchable Multimodal Sensor for Strain, Pressure and Shear Stress, including their design, fabrication, characterization and applications.

Biography:

Prof Weiliang Peter Xu (徐卫良) received the B.E. degree in manufacturing engineering and the M.E. degree in mechanical engineering from Southeast University, Nanjing, China, in 1982 and 1985, respectively, and the Ph.D. degree in mechatronics and robotics from Beijing University of Aeronautics and Astronautics, Beijing, China, in 1988. He joined The University of Auckland, Auckland, New Zealand, on February 1, 2011, as Chair Professor in Mechatronics Engineering. Before this appointment, from 2007 to 2010, he was a Professor of mechatronics, from 2005 to 2006, was an Associate Professor, and from 1999 to 2004, was a Senior Lecturer in the School of Engineering and Advanced Technology, Massey University, New Zealand. Prior to coming to New Zealand, from 1993 to 1998, he was with the City University of Hong Kong, from 1990 to 1992, was with the University of Stuttgart, Germany, and from 1988 to 1989, was with Southeast University, China.

Dr. Xu is a Fellow of the Institution of Professional Engineers of New Zealand. Since 2003, he has been serving as an Associate Editor of the *IEEE TRANSACTIONS ON INDUSTRIAL ELECTRONICS*; from 2008 to 2009, was an Associate Editor of the *IEEE Robotics and Automation Magazine*; and from 2005 to 2010, was an Editor for the *International Journal of Intelligent Systems Technologies and Applications*. He received the Alexander von Humboldt Research Fellowship (Germany) in 1990, the Fung Ying Tung Young Academics Research Award (China) in 1996, the Korean Federation of Science and Technology Research Fellowship (South Korea) in 2006, and the Japan Society of the Promotion of Science Research Fellowship (Japan) in 2010.

Prof Xu is the Director of Mechatronics Engineering Program. He is also Principal Investigator of the New Zealand Medical Technologies Centre of Research Excellence (CoRE) and Associate Investigator of The Dodd-Walls Centre for Photonic and Quantum Technologies (CoRE) and Riddet Institute (CoRE).