Speaker	Tong Boon TANG
Talk Title	Functional Near Infrared Spectroscopy and Its Applications
Institution	Universiti Teknologi PETRONAS
Department	Department of Electrical and Electronic Engineering
E-mail	tongboon.tang@petronas.com.my
Webpage	http://www.utp.edu.my/staff/ex.php?mod=ex&sn=142746

1. Tentative Abstract

Functional Near Infrared Spectroscopy (fNIRS) has been proposed as a means to detect mental stress by measuring the concentration change of oxygenated haemoglobin (HbO) and deoxygenated haemoglobin (HbR) on the prefrontal cortex. In this study, simultaneous measurement of EEG-fNIRS on five healthy subjects was performed. We investigated on the correlation between the haemodynamic responses and EEG alpha rhythm of mental stress during arithmetic task. The study demonstrated the significance of EEG and fNIRS signals in discriminating mental stress from baseline with p-value of 0.04 and 0.0014 respectively. We confirm that there is a correlation between EEG Alpha rhythm and concentration change of oxygenated haemoglobin with stress task. Using support vector machine (SVM), the detection rate of mental stress is 81%, and 95% using fNIRS and EEG respectively.

2. Brief Biography

Tong Boon TANG received the B.Eng. degree in Electronics and Electrical Engineering and Ph.D. degrees in Intelligent Sensor Fusion from the University of Edinburgh, UK, in 1999 and 2006, respectively. In 2012, he joined the Department of Electronic and Electrical Engineering, Universiti Teknologi PETRONAS as an Associate Professor. Previously, he worked as an ASIC engineer of Lucent Technologies, Singapore, and a senior Research Fellow at Institute of Integrated Micro and Nano Systems, the University of Edinburgh, UK. He is currently an Associate Editor for Journal of Medical Imaging and Health Informatics. He was the recipient of the IET Nanobiotechnology Premium Award in 2008, and the Lab on Chip Award in 2006.

3. List of Representative Publications

- T.B. Tang, A.F. Murray, S. Roy, "Methodology of statistical RTS noise analysis with charge-carrier trapping," IEEE Transactions on Circuits and Systems I, vol.57(5), May 2010, pp 1062-1070.

- T.B. Tang, S. Smith, B.W. Flynn, J.T.M. Stevenson, A.M. Gundlach, H.M. Reekie, A.F. Murray, D. Renshaw, B. Dhillon, A. Ohtori, Y. Inoue, J.G. Terry, A.J. Walton, "Implementation of Wireless Power Transfer and Communications for an Implantable Ocular Drug Delivery System," IET Nanobiotechnology, vol 2(3), September 2008, pp 72-79.
- T.B. Tang, E. Johannessen, L. Wang, A. Astaras, M. Ahmadian, A.F. Murray, J.M. Cooper, S.P. Beaumont, B.W. Flynn, D.R.S. Cumming, "Toward a Miniature Wireless Integrated Multisensor Microsystem for Industrial and Biomedical Applications," IEEE Sensors Journal: Special Issue on Integrated Multisensor Systems and Signal Processing, vol 2(6), December 2002, pp 628-635.