

Joint event on

WORLD CONGRESS ON SMART MATERIALS AND STRUCTURES

&

3rd International Conference on

POLYMER CHEMISTRY AND MATERIALS ENGINEERING

November 21-22, 2019 | Singapore



Chengkuo Lee

National University of Singapore, Singapore

Textile based smart sensors and nanogenerators as platform technology for internet of things (IoT) applications

Wearable sensors have received extensive development across the world towards diverse applications in healthcare, sports monitoring, and smart home. Socks with sensing capabilities can reveal more direct sensory information on the body for longer duration in daily life. Textiles-based Triboelectric nanogenerator (T-TENG) not only could be an optimal option for scavenging low-frequency waste energy from body motions as a power source, but also can be used as self-powered sensors due to its soft, flexible, and thin characteristics. With the integration of a high-voltage diode and a mechanical switch, the T-TENG socks are able to generate a high closed-loop current which is used to harvest energy from normal walking to power a Bluetooth module for wireless sensory data transmission under Internet of Things (IoT) framework. In addition, leveraging personalized triboelectric output features, artificial intelligence (AI) based comprehensive gait analysis can tell us about the identification, health condition, and activity of the users.

In general, the smart triboelectric socks offer a complete AIoT platform in the applications of foot-based energy harvesting and monitoring the diversified physiological signals for healthcare and smart homes.

Biography

Chengkuo Lee received his Ph.D. degree in precision engineering from The University of Tokyo, Tokyo, Japan, in 1996. Currently, he is the director of Center for Intelligent Sensors and MEMS at National University of Singapore, Singapore. He cofounded Asia Pacific Microsystems, Inc. (APM) in 2001, where he was Vice President of R&D from 2001 to 2005. From 2006 to 2009, he was a Senior Member of the Technical Staff at the Institute of Microelectronics (IME), A-STAR, Singapore. He has co-authored 300+ journal articles and 300+ conference papers. His google scholar citation is more than 9600+. He is Associate Editor of IEEE JMEMS. He is in the Executive Editor Board of J Micromechanics and Microeng. (IOP, UK). He is the Associate editor of Journal of Micro/Nanolithography, MEMS and MOEMS (JM3; SPIE). He is also the Editor of Scientific Reports, Sensors (MDPI), Micromachines (MDPI), and Journal of Sensors (Hindawi).

e: elelc@nus.edu.sg Notes: