Two scientists receive this year’s national science and technology awards for their outstanding contribution in research and innovation

THIS year, two scientists from NUS Engineering were awarded with the President’s Technology Award 2016 and the Young Scientist Award 2016 respectively.

Professor Liu Bin, with the Department of Chemical & Biomolecular Engineering, was conferred the President’s Technology Award 2016 on 18 October at the Istana, in recognition of her outstanding research and innovative work on organic fluorescent materials, particularly fluorogens with aggregation-induced emission (AIE), which have a wide range of applications in the fields of biomedical research, environmental monitoring and electronic devices.

Since 2011, Prof Liu’s research had focused on a special type of luminescent material with AIE properties - these are fluorogens that are non-emissive in dilute solutions and could be induced to emit intensively in aggregates. The molecules have been subsequently developed into AIE bioprobes. The simple fluorescent feature of the AIE molecular bioprobes offers direct visualisation of specific analytes (e.g. cancer cell markers) and biological processes (e.g. cellular apoptosis) with higher sensitivity and better accuracy than commercial fluorescent probes. With different formulations and surface functionalities, the AIE dot bioprobes show advanced features over the commercially available quantum dots (QD) and small molecule dyes, enabling longer term cell tracing and tumour imaging in a non-invasive and high contrast manner.

The AIE probe technology is timely; it specifically addresses one of the challenges faced by the rapidly developing cancer research and cell-based therapies, which require real-time non-invasive cell imaging and tracing technology.

Prof Liu co-founded an NUS start-up company “Luminicell” to commercialise the technology. Luminicell is currently working with international and local bio-tech companies to further develop and advance its technology.

The President’s Science and Technology Awards (PSTA) are the highest honours bestowed on exceptional research scientists and engineers in Singapore for their excellent achievements in science and technology, and outstanding and invaluable contributions the research and development landscape in Singapore.
Dr Benjamin C. K. Tee, Adjunct Assistant Professor with the Department of Materials Science & Engineering and the Department of Electrical & Computer Engineering, was recognised with the Young Scientist Award (YSA) 2016 for his achievements in research and innovation.

Inspired by the capabilities of human skin, Dr Tee’s research in artificial skin led him to develop novel sensitive, self-healing, flexible and stretchable materials for the next-generation human-machine interfaces that can be applied in robotics, healthcare and prosthetic devices. Using the technology developed, he has created the world’s smallest passive (non-powered) pressure sensor that can be used for intra-cranial pressure and subcutaneous heart rate monitoring devices. Dr Tee has also gone to develop a technique creating highly flexible and transparent electrodes using carbon nanotubes on a stretchable substrate, making them useful for next-generation flexible and stretchable displays.

In his cross-disciplinary research work in artificial skins, Dr Tee has created a number of the world’s first novel innovations, such as the repeatable self-healing electronic sensor skin, which he invented by developing a unique composite material with hydrogen bonds as the repeatable healing mechanism. He has also demonstrated for the first time, a new biometric pressure sensor that functions in the same way as human skin sensors. This sensor technology can be used to communicate with brain cells, paving the way for new sensor skins in neural prosthetic devices.

The Young Scientist Awards (YSA) recognise young researchers, aged 35 years and below, who are actively engaged in R&D in Singapore, and who have shown great potential to be world-class researchers in their fields of expertise.

Related links: