

# Biomedical Engineering Seminar Series

1st Semester, Academic Year 2017



Date: October 31, 2017

Time: 11.00 AM - 12.00 PM

Room 6373, 3rd level, Building 3,  
Department of Biomedical Engineering,  
Faculty of Engineering;  
Mahidol University



## Dr. Muhammad J. A. Shiddiky

School of Natural Sciences & Queensland Micro- and Nanotechnology  
Centre (QMNC), Griffith University, Australia

### "Towards precision medicine: Nanomaterials based novel biosensors in cancer"

The development of user-friendly, rapid and low-cost diagnostic method that can diagnose and treat cancer molecular biomarkers at point-of-care using minimal specialised infrastructure, have the potential to transform health care to many millions people both in the developed and developing countries. Recent advances in sequencing and proteomics technologies have now given rise to a large number of potentially useful genetic, epigenetic and other novel molecular biomarkers for the development of new diagnostic methods for diseases including cancer and neurodegenerative diseases. Despite these great input from nanobiotechnology and bioengineering research, significant technical challenges for achieving point-of-care diagnostic methods are yet to be overcome. This is partly due to the lack of sensitive, specific, rapid and low-cost detection methods. We have recently developed several electrochemical or optical strategies to isolate, amplify and quantitatively display the molecular targets in cancer patients. These includes new methods for detecting DNA modifications (i.e. methylation), gene-fusion, circulating-free miRNA, exosomal miRNA, protein biomarkers, and humoral immune response (autoantibody).<sup>1-8</sup> This presentation shall review some of these developments highlighting their applications into the clinics.

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