Advances in Wearable Technologies and EM Structures for Next Generation Healthcare and Biomedical Solutions

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Abstract

With the advent of commercial products, such as Google Glass, Samsung Galaxy Gear and the expected iWatch, body-centric communication has increasingly garnered the public attention and smoothly translated state-of-the-art research work into reality. With the development of nanotechnology, the idea of connecting nano-devices to conduct complicated tasks and communicate the information collected by these sesnors was a natural progression in order to complete the overall picture of a new generation of body-centric wireless networks. Connecting these nano-machines (or nano-devices) together in order for them to execute a useful function and deliver information between nano-nodes and ultimately interfacing to users or the outside world, the birth of nano-communication and networking was a necessity. Nano-scale communication is referred to the exchange of information at the nanoscale and it is the basis of any wired/wireless interconnection of nano-devices in a nano-network. The way the nano-devices communicate with each other has strong dependence on the way in which they are realised. In addition, the specific application of the nano-network determines the deployment of the nano-networks, thus constraining the choice on the particular type of nano-communication.

The talk will present development of reliable and comprehensive channel modelling, human tissue electric properties in the THz band and networking technologies to address the major challenges of the nano-scale electromagnetic channels needed for body-centric wireless nano-networks deployed in future healthcare applications. With the advancement of nano-scale machine fabrication and the deep understanding of molecular behaviour within the human body, future healthcare monitoring and feedback systems are expected to be comprehensive, efficient and ubiquitous hence coupling existing wireless wearable sensors and implantable units with nano-machines and networks.