"Intra-body Communication for WBANs: Recent Advances and Future Directions"

Abstract:

Wireless Body Area Networks (WBANs) have recently gained substantial recognition and interest in both academic and industrial communities due to its direct and beneficial impact both economically and socially in various application domains. Such networks refer to a number of nodes/units scattered across the human body and the surrounding areas to provide communication on the body surface, to access points and wireless devices in the near vicinity and also to provide hierarchal networking structure from implants to the main communication hub. Such networks combine multiple concepts including also wireless sensor networks, indoor networks and extended body-to-body communication considering all their associated concepts and requirements. BCWN has got numerous number of applications in our everyday life, including healthcare, entertainment, space exploration, military and so forth. The tutorial will investigate and explore current state-of-the-art and also challenges in the research and development domain with clear guidance on solutions related to antenna engineering, wireless sensors, radio channel modelling and system evaluation.

Bios of Tutorial Presenters:

Akram Alomainy received the M.Eng. degree in communication engineering and the Ph.D. degree in electrical and electronic engineering (specialized in antennas and radio propagation) from Queen Mary University of London (QMUL), U.K., in July 2003 and July 2007, respectively. He joined the School of Electronic Engineering and Computer Science, QMUL, in 2007, where he is an Associate Professor (Senior Lecturer) in the Antennas and Electromagnetics Research Group. He is a member of the Institute of Bioengineering and Centre for Intelligent Sensing at QMUL. His current research interests include small and compact antennas for wireless body area networks, radio propagation characterization and modelling, antenna interactions with human body, computational electromagnetic, advanced antenna enhancement techniques for mobile and personal wireless communications, and advanced algorithm for smart and intelligent antenna and cognitive radio system. He has managed to secure various research projects funded by research councils, charities and industrial partners on projects ranging from fundamental electromagnetic to wearable technologies. He is the lead of Wearable Creativity research at Queen Mary University of London and has been invited to participate at the Wearable Technology Show 2015, Innovate UK 2015 and also in the recent Wearable Challenge organized by Innovate UK IC Tomorrow as a leading challenge partner to support SMEs and industrial innovation. He has authored and co-authored a book, five book chapters and more than 150 technical papers (2800+ citations and H-index 25) in leading journals and peer-reviewed conferences. Dr. Alomainy won the Isambard Brunel Kingdom Award, in 2011, for being an outstanding young science and engineering communicator. He was selected to deliver a TEDx talk about the science of electromagnetic and also participated in many public engagement initiatives and festivals. He is a member of the IET, senior member of IEEE, fellow of the Higher Education Academy (UK) and also a College Member for Engineering and Physical Sciences Research (EPSRC, UK) and its ICT prioritization panels. He is also a reviewer for many funding

agencies around the world including Expert Swiss National Science Foundation (SNSF) Research, the Engineering and Physical Sciences Research Council (EPSRC), United Kingdom and the Medical Research Council (MRC), UK. He is an elected member of UK URSI (International Union of Radio Science) panel to represent the UK interests of URSI Commission B (1 Sept 2014 until 31 Aug 2017).

Raed Shubair is a Professor of Electrical Engineering at the Electrical and Computer Engineering Department, Khalifa University, UAE. He is also affiliated with MIT as Visiting Research Scientist at the Research Laboratory of Electronics (RLE) and Department of Electrical Engineering and Computer Science (EECS) at Massachusetts Institute of Technology (MIT). Raed Shubair received both his B.Sc. degree (with Distinction and Class Honors) and Ph.D. degree (with Distinction) in Electrical Engineering, from Kuwait University (Kuwait, June 1989) and University of Waterloo (Canada, Feb 1993), respectively. He is recipient of University of Waterloo Distinguished Doctorate Dissertation Award in 1993. Raed Shubair is an affiliate of University of Waterloo Center for Intelligent Antenna and Radio Systems and University of Waterloo Center for Bioengineering and Biotechnology. His current research interests include wireless body communications, nanoantennas and biosensors for medical applications, and bio-electromagnetics. Prof. Raed Shubair has been invited speakers at a number of prominent universities and research centers including recently Massachusetts Institute of Technology, Ohio State University, Queen Mary University of London, and Imperial College. Prof. Raed Shubair research publications include US patents, book chapters, papers in IEEE transactions and international journals, and papers in IEEE conferences and workshops. Prof. Shubair is a Fellow of MIT Electromagnetics Academy and Senior Member of IEEE. He is the Chair of IEEE AP-S Educational Initiatives Committee and currently serves as TPC Chair of IEEE MMS'2016.