

Workshop Keynote Speaker  
Dr. Bruno Clerckx

**Title:** "Towards A Signal Theory for Wireless Transmission of Information and Power"

**Abstract:** Wireless communication has shaped our society. Wireless is however not limited to communication. Far-field wireless power has recently become recognised as feasible for energising low-power devices due to reductions in power requirements of electronics. As wireless has disrupted communication, wireless will also disrupt the delivery of energy.

Interestingly, radio waves carry both energy and information. Nevertheless, energy and information have traditionally been treated separately. Imagine instead a wireless network where information and energy flow together through the wireless medium. Wireless communication, or Wireless Information Transfer (WIT), and Wireless Power Transfer (WPT) would then refer to two extreme strategies respectively targeting communication-only and power-only. A unified Wireless Information and Power Transfer design would on the other hand have the ability to softly evolve in between those two extremes to make the best use of the RF spectrum and radiations and the network infrastructure to communicate and energize.

In this talk, I will discuss recent progress on laying the foundations of the envisioned network by establishing a novel and unified signal theory for transmission over the nonlinear wireless power channel and the linear wireless communication channel and identifying the fundamental tradeoff between conveying information and power wirelessly. Recent results on the prototyping and experimentation of those new signals will also be discussed.

**Bio:** Bruno Clerckx is a Reader (Associate Professor) in the Electrical and Electronic Engineering Department at Imperial College London (London, United Kingdom). He received his M.S. and Ph.D. degree in applied science from the Université catholique de Louvain (Louvain-la-Neuve, Belgium) in 2000 and 2005, respectively. From 2006 to 2011, he was with Samsung Electronics (Suwon, South Korea) where he actively contributed to 3GPP LTE/LTE-A and IEEE 802.16m and acted as the rapporteur for the 3GPP Coordinated Multi-Point (CoMP) Study Item. Since 2011, he has been with Imperial College London, first as a Lecturer (2011-2015), then as a Senior Lecturer (2015-2017), and now as a Reader. From March 2014 to March 2016, he also occupied an Associate Professor position at Korea University, Seoul, Korea. He also held visiting research appointments at Stanford University, EURECOM, National University of Singapore and The University of Hong Kong.

He is the author of 2 books, 140 peer-reviewed international research papers, 150 standard contributions and the inventor of 75 issued or pending patents among which 15 have been adopted in the specifications of 4G (3GPP LTE/LTE-A and IEEE 802.16m) standards. Dr. Clerckx served as an editor for IEEE TRANSACTIONS ON COMMUNICATIONS from 2011-2015 and is currently an editor for IEEE TRANSACTIONS ON WIRELESS COMMUNICATIONS. He is an Elected Member of the IEEE Signal Processing Society SPCOM Technical Committee. His research area is communication theory and signal processing for wireless networks.