Title: From Wireless Power Transfer to Wireless Powered Communications

Abstract:

This tutorial aims to familiarize the attendees with the new communication paradigm of wireless powered communications (WPC). Conventional energy-constrained wireless systems such as sensor networks are powered by batteries and have limited lifetime. Wireless power transfer is a promising technology for energy sustainable networks, where terminals can harvest energy from the ambient electromagnetic radiation through appropriate electronic circuits. Since radio signals carry both information and energy at the same time, a unified study on simultaneous wireless information and power transfer (SWIPT) is an emergent topic. In this tutorial, we discuss the principles of WPC with an emphasis on the integration of the SWIPT concept in modern communication systems such as broadcast channel, relay channel, interference channel and ad-hoc networks. The tutorial is divided into three parts. In the first part, we will present the basic background of the tutorial and we will introduce some fundamental notions of wireless communications, cooperative networks, and stochastic geometry. In the second part, particular attention is paid to the main characteristics of WPC technology as well as the key networking structures and performance enhancing techniques. The third part focuses on the SWIPT architecture and its main practical implementation techniques. We study different network topologies and particular attention is given to the employment of SWIPT in cooperative networks; a system-level analysis of SWIPT is also presented by using tools from stochastic geometry and convex optimization.

Bio:

Dr. Ioannis Krikidis received the diploma in Computer Engineering from the Computer Engineering and Informatics Department (CEID) of the University of Patras, Greece, in 2000, and the M.Sc and Ph.D degrees from Ecole Nationale Superieure des Telecommunications (ENST), Paris, France, in 2001 and 2005, respectively, all in electrical engineering. From 2006 to 2007 he worked, as a Post-Doctoral researcher, with ENST, Paris, France, and from 2007 to 2010 he was a Research Fellow in the School of Engineering and Electronics at the University of Edinburgh, Edinburgh, UK. He is currently an Assistant Professor at the Department of Electrical and Computer Engineering, University of Cyprus, Nicosia, Cyprus. His current research interests include wireless communications, wireless powered communications, cooperative communications, cognitive radio, and secrecy communications.

Dr. Krikidis serves as an Associate Editor for the IEEE Transactions on Communications, and IEEE Wireless Communications Letters. He was the Technical Program Co-Chair for the IEEE International Symposium on Signal Processing and Information Technology 2013 as well as the Lead Guest Editor of the Special Issue on Exploiting interference towards Energy Efficient and Secure Wireless Communications, IEEE Journal of Selected Topics in Signal Processing, December 2016. He has published over 150 papers in scientific journals and international conferences and his work is well recognized with more than 4000 citations. He received an IEEE Communications Letters and IEEE Wireless Communications Letters exemplary reviewer certificate in 2012. He was the recipient of the Research Award Young Researcher from the Research Promotion Foundation, Cyprus, in 2013, as well as the recipient of the IEEE ComSoc Best Young Professional Award in Academia in 2016.