Special Issue on Advanced Wireless and Mobile Technologies and Services – Guest Editorial

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We have been witnessing a rapid development of wireless and mobile technologies and services during the past two decades. 4G mobile services are penetrating, mobile access is becoming an increasingly important way for accessing the Internet, and it is expected to become the dominant one. The progress continues as 5G mobile systems are underway. Although many of the new technologies have already been incorporated in practical systems, there is still enough room for research and experimentation, in particular in the areas of cognitive radio, self-organizing networks, M2M communications, or cross-layer optimization, just to name a few.

The 21st European Wireless (EW) Conference was held in Budapest, Hungary, between 20-22 May 2015, and has been organized by the Budapest University of Technology and Economics (BME). The EW 2015 conference was attended by more than **140 participants** from **30 different countries**. From the conference program, 7 papers were selected for the European Wireless Special Issue, which consists of two parts. The following 5 papers form Part I and are published in this issue, while further 2 papers will appear in the 2015/IV issue as Part II.

The first three papers focus on the physical layer of air interfaces of state-of-the-art wireless systems. *Sebastian Baumgartner* and his colleagues developed a method in OFDM-based DAB/DAB+ systems over dispersive fading channels for the joint estimation of the symbol timing offset, the frequency offset and the channel length from the approximated Log-Likelihood function. In addition, they proposed a CP-based synchronization method, based on a modified timing function that targets the estimation of the parameters from the interference-free region within the cyclic prefix. Simulation results show that the proposed algorithms outperform considerably other algorithms and are robust to varying channel conditions.

Filter bank multicarrier (FBMC) modulation is a promising candidate as the primary physical layer waveform in next generation broadband networks. However, FBMC, like other multicarrier schemes, suffer from high peak-to-average power ratio (PAPR). *Bálint Horváth and Péter Horváth* present how to establish lower bounds on the PAPR in Filter Bank Multicarrier Systems by achieving PAPR reduction for short FBMC frames.

Large MIMO systems are recognized as an effective technique for increasing the spectral and energy efficiency of wireless networks. *Qing Wang et al* considered large MIMO systems in indoor WLANs for multi-user MIMO (MU-MIMO) spatial multiplexing in the 2.4 GHz ISM band. The paper focuses on analyzing the behaviors of large MIMO systems with both centralized and distributed antenna system (CAS and DAS) architectures. The numerical results show that the optimum capacity can be closely approached with both CAS and DAS architectures when the number of Access Point (AP) antennas exceeds the users by a few times.

Above the PHY layer Medium Access Control is responsible for the efficient utilization of the common channel. Unfortunately the end-to-end throughput in single flow multi-hop Ad Hoc networks decays rapidly with path length. Along the path, the success rate of delivering packets towards the destination decreases due to higher contention, interference, limited buffer size and limited shared bandwidth constraints. In order to reduce buffer overflow *Jims Marchang, Bogdan Ghita, and David Lancaster* introduced a dynamic queue utilization based MAC protocol which enhances the performance of an end-to-end data flow by up to 30% for a six hop transmission in a chain topology. They demonstrated that this protocol remains competitive for other network topologies and for a variety of packet sizes.

Finally we present a mobile application related paper from *Péter Sarcevic and his coauthors*. Using wireless sensor networks of two wrist mounted 9-degree-of-freedom (9DOF) sensor boards, movement classification can be reliably done. The sensor boards or motes contain a tri-axial magnetometer, a tri-axial gyroscope, and a tri-axial accelerometer. If the classification is assigned to only one mote, which is using the data from both sensor boards, very energy consuming wireless data transfer is required. In this paper, a hierarchical-distributed algorithm is presented, where the motes are calculating their own movement classes, which can be combined on one mote, to determine the movement of the entire body and arms. The proposed method requires less and smaller classifiers, which can be easily implemented on low performance motes.

We hope this careful selection will satisfy our readers' expectations and please, do not forget to follow Part II of this Special Issue in Issue IV, 2015.

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