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# *Editorial*
# Dynamic Spectrum Access for Wireless Networking

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Reforms to the traditional command-and-control communication spectrum licensing policy are being considered worldwide, in several countries. The flexibility offered by the new spectrum policies is expected to enable wireless devices to opportunistically access spectrum in both the licensed and unlicensed bands. Clearly, the success of such an emerging dynamic spectrum access paradigm depends on the cross-disciplinary wireless technologies, policies, and standards. This special issue contains contributed and invited paper focusing on several key aspects of dynamic spectrum access wireless networks, namely, spectrum sensing, user cooperation in spectrum access, spectrum sharing, security, game theoretic modeling, network coding, and theoretical and experimental performance analysis of dynamic spectrum access networks. We would like to thank the Editor-in-Chief, Philip Regalia, for his support. We are also grateful to all the reviewers and the invited authors.

S.-J. Kim and G. B. Giannakis discuss sequential spectrum sensing and model it as a stopping time problem in their invited paper. A suboptimal algorithm that has reduced complexity is also discussed. H. Li proposes a dynamic programming formulation of quickest spectrum sensing in multichannel cognitive radio networks. Some control policies are derived based on this. Optimizing the spectrum sensing receiver for delay sensitive applications is the main goal of the paper by H. Zamat and B. Natarajan. They investigate the optimal number of coarse and fine bins that minimize the overall detection time required to identify idle channels under various system conditions. A. J. Coulson uses simulations to show that hidden Markov modelling and power spectral analysis with edge enhancement are more robust than a simple interference temperature-based energy detection.

L. Lightfoot et al. consider highly efficient antijamming system design using secure dynamic spectrum access control. They propose a collision-free frequency hopping (CFFH) system based on the OFDMA framework and an innovative secure subcarrier assignment scheme. Their results indicate that the combination of space-time coding and CFFH is particularly powerful in eliminating channel interference and hostile jamming interference, especially random jamming.

L. Giupponi and C. Ibars consider cooperating secondary and primary users for dynamic spectrum sharing. They make use of theory of exact and Bayesian potential games to study this problem and show that the lack of complete information in the game theoretic decision process only slightly reduces system performance. H. Li et al. present radio frequency measurement setup and experimental results in the 2.4 GHz band. Using the measurement they then develop an analytical model to characterize the coexistence interference in the ISM bands. Numerical results show that beamforming significantly improves the system outage performance. X. Xiao et al. investigate opportunistic spectrum access using a self-similar traffic model for primary transmission in their invited paper. Based on a multiple time-scale hierarchical Markovian model, they formulate the problems as a partially observable Markov decision process. They observe that a myopic policy achieves comparable performance as the optimal policy that requires exponential complexity and assumes full knowledge of the channel model.

M. Bennis et al. consider the problem of spectrum sharing where competitive operators coexist in the same frequency band. This is modeled as a strategic noncooperative game and a Stackelberg game. It is shown that the Stackelberg approach yields better payoffs for operators compared to the classical water-filling approach.

R. Couillet and M. Debbah discuss the performance of a new OFDM-based modulation scheme. Their framework is then extended to multiantenna and multicellular OFDM-based standards. Simulation results indicate that their theoretical analysis is accurate. T. Newman et al. (invited paper) use an experimental setup to investigate the potential effects of secondary users operating in unoccupied television spectrum. This study strongly suggests that secondary users could operate "White Space Devices" (WSDs) in unoccupied channel bandwidth directly adjacent to a desired digital television (DTV) channel, with no observable adverse impact upon the reception of the desired channel content.

X. Chen et al. study network coding for cognitive mesh networks in their invite paper. It is shown that network coding-based intercluster connection has the advantage of higher bandwidth efficiency compared with the traditional strategy. Analysis and simulations show that intelligent network coding can achieve optimal throughput for the intercluster relaying in the long run.

Hope you find these papers helpful for your own research on dynamic spectrum access networking.

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