

Dynamic Spectrum Access in Wireless Networks: Overview

(IEEE Communications Society Distinguished Lecture)

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Date: October 11, 2012 (Thursday)
Time: 5:00 pm (refreshment starts at 4:45 pm)
Place: 202 ECEC, NJIT

About the Speaker



Zhensheng Zhang received his Ph.D. in electrical engineering from the University of California, Los Angeles. Dr. Zhang has over twenty years' experience in design and analysis of network architecture, protocols and control algorithms, with very strong backgrounds in performance analysis, modeling and simulation of the communication networks. He is currently with Cubic Corporation, Senior Principal Scientist, Networking Research. Before joining Cubic, he worked at SDR/Argon/Boeing for 8 years as Principal Scientist, serving as Principal Investigator for many DOD projects. He worked at Sorrento Networks, Department of System Architecture, for 2 years, responsible for designing the next-generation optical metro networks using the GMPLS control

framework. Prior to Sorrento Networks he was with Bell Laboratories, Lucent Technologies, focusing on research and development in wireless networks. Dr. Zhang served as Editor of IEEE Transaction on Wireless Communications from 2002 to 2006. He served as the General Chair of Broadband Wireless Networking Symposium, October 2004. He was a Guest Editor for the IEEE JSAC special issue on Overlay Networks (2003) and the Journal of Wireless Networks issue on multimedia wireless networks (August 1996). Dr. Zhang is a Member at Large of the IEEE San Diego section (2004, 2011, 2012) and is the Chair of IEEE Communications Society San Diego Chapter (2004-2012). His research interests include wireless ad hoc networks and wireless sensor networks. He has given many invited talks and tutorials on wireless ad hoc networks at various conferences. He is an IEEE ComSoc Distinguished Lecturer (2010-2013).

Dr. Zhang is the IEEE Globecom2012 TPC Chair.

About the Talk (registration: https://meetings.vtools.ieee.org/meeting_registration/register/14557)

Current frequency planning and assignment for wireless communications are done manually and result in inefficient use of spectrum. When observed in a frequency-time plane, the actual instantaneous use of spectrum is minimal. The need for dynamic spectrum access is paramount given the loss of available spectrum due to Government auction combined with the increased demand placed by modern wideband communications systems. A gap exists between the need for spectrum and the ability to access it dynamically in the frequency-time plane. To fill in this gap, Dynamic Spectrum Access (DSA) and cognitive radios/networks have been proposed in wireless networks.

In this talk, we present a high level, brief overview on the recent developments of the dynamical spectrum access techniques, focusing on a broad range of areas: motivations, standard activities, three models for dynamic spectrum access, characteristics of the available bandwidth of the primary users, sensing technologies and sensing intervals to detect white spaces/available spectrum, spectrum allocation and management algorithms (such as liner programming, graph coloring, game theory, machine learning), tradeoff between spectrum/performance gain versus additional overhead used in implementing DSA. We also present a brief overview of the security issues associated with DSA networks and recent DARPA programs related to dynamic spectrum access, including robust communications under extreme conditions, cognitive jamming and anti-jamming.

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