Invited Seminar
Optimal Joint Spectrum Allocation and Scheduling for Cognitive Radio Networks
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Date: September 25, 2013    Time: 11:00 am – 11:50 am    Place: SSOE Seminar Room NI-1027

Abstract: Cognitive Radio Network is considered as a promising paradigm for the future networks. To significantly improve spectrum utilization, we conduct optimal or near-optimal joint spectrum allocation and scheduling in cognitive radio networks. We address critical and practical challenges for spectrum allocation and scheduling in cognitive radio networks, in particular multi-hop cognitive radio networks, such as dynamic traffic demands and pattern, unpredictable primary user activity, wireless interference, and coexistence. We develop creative models and algorithms in the framework of restless multi-armed bandit where the problem for spectrum allocation and scheduling in cognitive radio networks is formulated as a partially observable Markov decision process. The proposed methodology is novel in that it intelligently combines the networked multi-armed bandit modeling, graph theory, and communication scheduling theories. The developed algorithms, models, and protocols significantly improve spectrum utilization in future wireless communication systems and advance the fundamental knowledge and understanding of cognitive radio networks. The proposed algorithms, protocols, and models enable future wireless systems to design, deploy, and operate much more efficiently than today’s systems, which will result in significant economical, societal, and public safety impacts.

Speaker Biography

Xiaohua Xu earned his PhD in Computer Science from Illinois Institute of Technology and then worked there as a Postdoctoral Researcher before joining the University of Toledo in 2012. Dr. Xu’s research interests include sensor networks, wireless networking, and cyber security. His research achievements have been internationally recognized. Over the years, he has published over 30 papers in highly respected conferences and journals, such as IEEE/ACM Transactions on Networking, and served on Technical Program Committees for several international conferences. Dr. Xu’s research is supported by NSF.