Editorial

Yang Xiao*

Department of Computer Science,
The University of Alabama,
101 Houser Hall, Box 870290,
Tuscaloosa, AL 35487-0290, USA
E-mail: yangxiao@ieee.org
*Corresponding author

Kui Wu

Department of Computer Science,
University of Victoria, Canada,
E-mail: wkui@cs.uvic.ca

Biographical notes: Yang Xiao is an IEEE Senior Member. He was a voting member of IEEE 802.11 Working Group from 2001 to 2004. He currently serves as an Editor-in-Chief for *International Journal of Security* and *Networks* and *International Journal of Sensor Networks*. He currently serves as an Associate Editor or on editorial boards for four other journals. He served as a guest editor for eight journal special issues. His research areas include wireless networks, mobile computing and network security. He has published more than 70 journal papers with 40 papers published in various IEEE journals. He has edited/co-edited ten books on wireless networks and security.

Kui Wu received his PhD in Computing Science from the University of Alberta, Canada, in 2002. He joined the Department of Computer Science at the University of Victoria, Canada in the same year and is currently an Assistant Professor there. He has been actively serving as a TPC member for numerous international conferences and workshops. His research interests include mobile and wireless networks, wireless sensor networks, network performance evaluation and network security.

This Special Issue focuses on the novel and practical ways to improve the MAC layer protocols in terms of QoS support, channel access and energy saving for WLANs, WPANs, ad hoc networks and sensor networks. The Call-for-papers for this Special Issue received an overwhelming response from the research community.

There were 40 paper submissions to this Special Issue. The submissions covered the various aspects of MAC protocols, MAC energy efficiency and MAC security. Unfortunately, due to limited space only 12 papers could be selected and included in this Special Issue, which represents an acceptance rate of 30%.

The first paper in this Special Issue, authored by Chunyu Hu, Rong Zheng, Jennifer C. Hou and Lui Sha, demonstrates via an analytical model that the periodic structure in IEEE 802.11 power-save model together with its signalling overhead leads to the under utilization of both energy and bandwidth under-utilisation. In particular, it proposes a new power management protocol to decouple the power management decision points and the beacon intervals, so as to allow fine-grained control.

The second paper, authored by Sameh Gobriel, Rami Melhem and Daniel D. Mosse, is focused on controlling transmission power in power-aware ad hoc networks. A unified collision and interference model of a uniformly distributed network is constructed to consider both collision and energy efficiency.

The third paper, authored by Asis Nasipuri and Samir R. Das, addresses the design of MAC for wireless ad hoc networks that derives benefits from using multiple orthogonal channels. It further proposes multichannel MAC protocols with signal-power based channel selection and shows that the proposed protocols can provide significantly higher throughput than that obtained by using the IEEE 802.11 MAC.

The next paper, authored by Maode Ma and Shin Yeh Low, proposes a scheduling algorithm for the polling protocol to support real-time traffic streams over Bluetooth networks to meet their delay constraints. Simulation studies are carried out to validate the scheme.

The fifth paper, authored by Tiantong You, Hossam Hassanein and Chi-Hsiang Yeh, presents a Carrier Sense Medium Access/ID Countdown (CSMA/IC) for multihop ad hoc wireless networks.

The sixth paper, authored by Jean Lorchat and Thomas Noel, describes a power saving mechanism that saves energy on battery-powered devices by adding some processing on the wireless Access Point (AP).

The seventh paper, authored by Danyan Chen, Xiaofeng Wang and A.K. Elhakeem, proposes a call

admission control algorithm and its associated resource allocation mechanism for the recently proposed Multi-Pattern (MP) WLANs.

The eighth paper, authored by Yanfeng Zhu and Zhisheng Niu, proposes a dynamic polling mechanism to enhance the system capacity in supported voice stations over IEEE 802.11e based WLANs.

The ninth paper, authored by Fen Hou, Pin-Han Ho and Xuemin Sherman Shen, proposes a Differentiated Automatic Repeat reQuest (DARQ) scheme for MPEG video streaming over wireless links, in which the inter-frame dependency and error propagation are jointly considered and a specific retransmission attempt is assigned to each frame in a Group Of Pictures (GOP) according to its significance in the reconstruction of the video at the end user.

The tenth paper, authored by Yihong Zhou, Dapeng Wu and Scott M. Nettles, studies two types of MAC layer DoS attacks and proposes a packet-by-packet authentication scheme so that legitimate nodes can reject data transmission requests from unauthenticated adversaries.

The eleventh paper, authored by Yang Xiao, Chaitanya Bandela, Xiaojiang Du, Yi Pan and Edilbert Kamal Dass, first introduces the Wired Equivalent Privacy (WEP) in IEEE 802.11 WLAN as well as all kinds of attacks. Then, two approaches to enhance the WEP are proposed to overcome some known vulnerabilities and thus to provide better data confidentiality and authentication. Finally, simulation methodology is presented and simulation results are provided.

The twelfth paper, authored by Chia-Ming Chou, Shih-Feng Hsu, Hsin-Yi Lee, Yung-Chun Lin and Yi-Bing Lin, designs and develops a CORBA-based Open Service Access system and shows how OSA API interfaces and functions can be implemented by CORBA clients, stubs, servants and skeletons and how CORBA POA and ORB are set up for the OSA implementation.

In summary, all 12 papers included in this Special Issue have discussed either MAC or related issues for WLANs, WPANs, ad hoc networks and sensor networks and can serve as very useful references to the community.

Last but not the least, we would like to take this opportunity to express our thanks to all authors who submitted their papers to this Special Issue, as well as many reviewers' constructive reviews which made the success of this Special Issue possible and ensured very high quality. Finally, we would like to express our gratitude to the Editor-in-Chief of IJWMC Journal, Professor Laurence T. Yang, for his cordial help throughout the publication process of this Special Issue.