

MOBILE CLOUD COMPUTING

Dear readers,
The summer comes again. I would like to take this opportunity to wish all of you a wonderful summer season, enjoying your holidays/travels, and most importantly staying healthy.

The June issue of this magazine is dedicated to two sections, one being a feature topic (FT) on “Mobile Cloud Computing,” which obviously is a very hot research topic in wireless communications. The other part will give you ten Open Call papers, contributed by the people from both academia and industry.

The feature topic section of this issue contains seven well-selected papers. For this I would like to thank the four guest editors, Victor C.M. Leung, University of British Columbia, Canada, Yonggang Wen, Nanyang Technological University, Singapore, Min Chen, Huazhong University of Science and Technology, China, and Chunming Rong, University of Stavanger, Norway, for their diligent works to make it happen. For more detail information about the feature



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topic, please refer to the Guest Editorial followed and their respective papers.

The publication of ten Open Call papers in this issue is the part of our effort to clear up publication queue due to the large number of Open Call submissions. I have to say it is indeed a great endeavor for us to do this, due partly to the nature of bi-monthly publication of this magazine as well as the financial limit of ComSoc, which has tried all its best to help us to increase the page budget for this magazine; otherwise it is impossible to include 17 papers in this issue. Therefore, on behalf of all the readers and authors, I would like to thank ComSoc to give us the extra budget to clear the Open Call papers queue. In particular, I want to thank the ComSoc VP-Publications, Vincent Chan, and the ComSoc Director of Magazines, Steve Gorshe, for their strong support.

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The first Open Call article is entitled “Adaptive Neuro-Fuzzy Inference Models for Speech and Video Quality Prediction in Real-World Mobile Communication Networks,” co-authored by Charalampos N. Pitas, *et al.* In this article, the

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authors present a unified quality of service prediction methodology based on neuro-fuzzy inference systems that are widely used in contemporary rollout mobile communication networks. The work is concentrated very much on radio key performance indicators of mobile radio access networks, which affect speech and video quality of wireless multimedia communications, and on how to estimate Quality of end-user Experience (QoE) using fuzzy-based techniques. The article proposes a methodology based on modern experimental drive-test equipment, with which a measurement campaign was configured and conducted in various environments.

The second article is contributed by Quang-Dung Ho *et al.*, with its title “Challenges and Research Opportunities in Wireless Communication Networks for Smart Grid.” This article begins with a comprehensive review on the architectures and essential characteristics of Smart Grid Communication Networks (SGCNs). Different types of traffic that SGCN is anticipated to carry are discussed along with their Quality of Service (QoS) requirements. Then, a number of critical challenges from wireless technology and network perspectives are addressed, such as wireless mesh routing, QoS provisioning, intelligent data filtering and fusion, optimal network design, and finally security concerns.

The next article was written by Daniel Camps-Mur, *et al.*, entitled “Device-to-Device Communications with WiFi Direct: Overview and Experimentation.” This article, as its title suggests, focuses on Wi-Fi Direct, which is a newly emerging technology defined by the Wi-Fi Alliance aimed at enhancing direct device-to-device communications in Wi-Fi systems. In this article the authors provide a very good overview of the novel functionalities defined in Wi-Fi Direct, and present an experimental evaluation.

The fourth article in the Open Call paper section is entitled “Video Streaming over an Ad Hoc Network using Data Partitioning and Path Diversity,” which was contributed by Ismail Ali, *et al.* This article describes a lower complexity and yet effective scheme for video streaming over wireless networks with rich multipath returns. As an effort to improve error resiliency, the proposed scheme combines unequal packet importance with path diversity. The scheme can be implemented with a minimal increase in computational complexity. The experimental results for an ad hoc wireless network showed that a significant objective quality gain can be achieved in the presence of signal shadow fading.

Fast handover for proxy mobile IPv6 (FPMIPv6) was proposed to reduce packet-delay that occurs during proxy mobile IPv6 (PMIPv6) handovers. The fifth Open Call article, entitled “Enhancements to FPMIPv6 for Improved Seamless Vertical Handover Between LTE and Heterogeneous Access Networks,” and co-authored by Jong-Moon Chung, *et al.*, is to discuss the issues related to vertical handover (VHO) experiments conducted between Long Term Evolution (LTE) and heterogeneous accesses over the evolved packet core (EPC) using FPMIPv6. In particular, this article proposes an enhanced FPMIPv6 technique to improve VHO performance using shorter data-paths.

The sixth Open Call article was written by Klaus I. Pedersen, *et al.*, with its title “Enhanced Inter-Cell Interference Coordination in Co-Channel Multi-Layer LTE-Advanced Networks.” The authors in this article discuss various technical solutions and innovations to enable the move from macro-only scenarios towards heterogeneous networks with a mixture of different types of base stations. This article focuses on multi-layer LTE-Advanced networks, and addresses different aspects related to interference management. The system level performance results under burst traffic are presented in this

article to demonstrate that the proposed concept is able to dynamically adapt according to the traffic conditions.

The article followed was co-authored by Kui Ren, *et al.* The article is titled as “Opportunistic Spectrum Access: From Stochastic Channels to Non-Stochastic Channels.” In this article, the authors first present an in-depth overview on the existing spectrum sensing and access protocols under stochastic channels, to achieve almost optimal performance in jamming-free scenarios. Then, the article goes further to analyze the vulnerability of these protocols to malicious jamming attacks. Finally, the authors discuss the spectrum sensing and access protocols under non-stochastic channels and show their robustness and resilience against various malicious jamming attacks.

The next Open Call article, entitled “Streaming 3D Meshes over Thin Mobile Devices,” was co-authored by Haifa Raja Maamaryz, *et al.* In this article, the authors provide a comprehensive survey on the existing 3D streaming techniques by classifying them based on the nature of the applications. The focus of this article is on the methods applied to adapt 3D streaming techniques to the changes in wireless network conditions. The authors also discuss the challenges that the 3D streaming techniques face from a network point of view, as well as the approaches and solutions proposed in the literature.

The ninth Open Call article is entitled “A Hierarchical Cooperation Formation Model for Downlink Data Transmission in Mobile Infostation Networks,” which was co-authored by Yifan Li, *et al.* This article focuses on an ideal of mobile infostation network, which was proposed as a new network paradigm to provide users with wireless data services, in order to achieve a good tradeoff between the connectivity requirement and economic investment. Focusing on such a network scenario, the authors found that the cooperation among infostations and mobile users can improve the network performance in term of expected delay of content distribution experienced by the users.

The tenth Open Call article was contributed by Yi-Bing Lin, *et al.*, with its title “Performance Measurements of TD-LTE, WiMAX and 3G Systems,” which is focused very much on the issues on how to measure and compare latency and throughput of Time Division-Long Term Evolution (TD-LTE), WiMAX, and third-generation (3G) systems based on several technical trials. The authors provide quantitative measures and comparisons as the guidelines for the operators to deploy their future networks.

BIOGRAPHY

HSIAO-HWA CHEN [S'89, M'91, SM'00, F'10] (hshwchen@ieee.org) is currently a Distinguished Professor in the Department of Engineering Science, National Cheng Kung University, Taiwan. He obtained his B.Sc. and M.Sc. degrees from Zhejiang University, China, and a Ph.D. degree from the University of Oulu, Finland, in 1982, 1985 and 1991, respectively. From 2001 to 2003, Professor Chen served as the founding Director of the Institute of Communications Engineering of the National Sun Yat-Sen University, Taiwan, which was the first telecommunication research institute established in the southern Taiwan. This institute has graduated a large number of telecommunication postgraduate degree holders for Taiwan. Professor Chen authored or co-authored over 300 technical papers in major international journals and conferences, six books and more than ten book chapters in the areas of telecommunications, including the books titled “Next Generation Wireless Systems and Networks” (512 pages) and “The Next Generation CDMA Technologies” (468 pages), both published by John Wiley and Sons in 2005 and 2007, respectively. He has been an active volunteer for various IEEE technical activities for over 22 years. He served as the general chair, TPC chair and symposium chair for many international conferences. He served or is serving as an Editor or/and Guest Editor for numerous major technical journals. He served as the Chair for IEEE ComSoc Communications and Information Security Technical Committee from 2010 to 2012, and served as the Chair for IEEE ComSoc Radio Communications Committee from 2007 to 2008. He is the recipient of the best paper award in IEEE WCNC 2008 and the recipient of 2008 IEEE Radio Communications Committee Outstanding Service Award. He is a Fellow of IEEE, a Fellow of IET, and a Fellow of BCS.