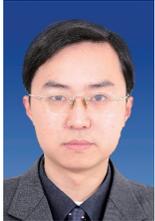# Editorial: Special Topic on
## Energy Consumption Challenges and Prospects on B5G Communication Systems

**GE Xiaohu** received the Ph.D. degree in communication and information engineering from the Huazhong University of Science and Technology (HUST), China in 2003. He has been working with HUST since November 2005. Prior to that, he was a researcher with Ajou University, South Korea, and the Politecnico di Torino, Italy, from January 2004 to October 2005. He is currently a full professor with the School of Electronic Information and Communications, HUST. He is also an adjunct professor with the Faculty of Engineering and Information Technology, University of Technology Sydney (UTS), Australia. He has authored more than 200 papers in refereed journals and conference proceedings and has been granted 35 patents in China. He is leading several projects funded by the NSFC, China MOST, and industries in China. He is taking part in several international joint projects, such as WiNDOW and CROWN sponsored by the EU FP7-PEOPLE-IRSES. His research interests include mobile communications, traffic modeling in wireless networks, green communications, and interference modeling in wireless communications. He was a recipient of the best paper awards from the IEEE GLOBECOM 2010. He serves as an associate editor of *IEEE Transactions on Vehicular Technology* and *IEEE Wireless Communications*. He is a senior member of the IEEE.

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The objective of this special issue was to attract high quality research articles on energy consumption challenges and prospects for beyond fifth generation (B5G) communication systems. We have received approximately 10 papers in different areas. The submitted papers were rigorously reviewed, and six papers were finally accepted.

The first paper entitled "Saving Energy for Wireless Transmission: An Important Revelation from Shannon Formula" by ZHU et al. presents two basic study points for wireless saving energy and provides the error-corrected modulation method based on extending the Shannon formulas. The numerical analysis shows that the given error-corrected modulation method greatly improves the energy-saving effect of the traditional method in theory. The second paper entitled "Efficient Network Slicing with Dynamic Resource Allocation" by JI et al. proposes a two-stage dynamic resource allocation framework that first makes decisions on the slices to which flows are assigned, and then coordinates resources adjustment among slices to overcome the resource imbalance. The proposed algorithm is evaluated in simulation environments for hierarchical ring 5G networks. The third paper entitled "Enabling Energy Efficiency in 5G network" by LIU et al. focuses on the energy efficiency of radio access networks and introduces NR cell switching on/off schemes in 3GPP to achieve energy efficiency in 5G RAN. The proposed scheme is experimented in the real wireless environment, whose power consumption can be reduced significantly. The fourth paper entitled "Cluster Head Selection Algorithm for UAV Assisted Clustered IoT Network Utilizing Blockchain" by LIN et al. proposes a designed unmanned aerial vehicle (UAV) cluster head selection algorithm for UAV networks assisted clustered IoT system. The simulation results show that the proposed algorithm has great advantages compared with the existing cluster head selection algorithms. The fifth paper entitled "Green Air-Ground Integrated Heterogeneous Network in 6G Era" by WU et al. is dedicated to discussing green communications of air-ground integrated heterogeneous network (AGIHN). From the aspects of green terrestrial network and green aerial network, challenges of green AGIHN are analyzed and several promising green techniques which can be employed in AGIHN are discussed. The final paper entitled "Kinetic Energy Harvesting Toward Battery-Free IoT: Fundamentals, Co-Design Necessity and Prospects" by LIANG et al. gives a brief introduction to the configurations and basic principles of practical KEH-IoT systems, including their mechanical, electrical, and computing parts.

We would like to thank all the authors for their valuable contributions. We hope that our readers will enjoy reading the articles and find this special issue helpful to their own research work.