
Editorial

Hsiao-Hwa Chen*

Institute of Communications Engineering,
National Sun Yat-Sen University,
Kaohsiung City, Taiwan
E-mail: hshwchen@ieee.org
*Corresponding author

Mohsen Guizani

Department of Computer Science,
Western Michigan University,
Kalamazoo, MI, USA
E-mail: mguizani@cs.wmich.edu

Biographical notes: Hsiao-Hwa Chen is a Full Professor in National Sun Yat-Sen University, Taiwan. He has authored or co-authored over 200 technical papers in major international journals and conferences and 6 books in the areas of communications, including *Next Generation Wireless Systems and Networks* (498p.) and *The Next Generation CDMA Technologies* (463p.), both published by John Wiley and Sons in 2006 and 2007.

Mohsen Guizani is currently a Full-time Professor and Chair in the Department of Computer Science Department at Western Michigan University. He served as Chair in the Department of Computer Science Department at the University of West Florida from 1999 to 2003. He is the Founder and Editor-in-Chief of *Wireless Communications and Mobile Computing Journal* (Wiley, <http://www.interscience.wiley.com/jpages/1530-8669/>). For more details, please visit <http://www.cs.wmich.edu/~mguizani/>.

Wireless sensor networks facilitate anywhere, anytime network connectivity between mobile devices or sensor nodes with complete lack of control, ownership and regulatory influence. The development of wireless sensor networks was originally motivated by military applications such as battlefield surveillance. However, wireless sensor networks are now used in many civilian application areas, including environment and habitat monitoring, healthcare applications, home automation and traffic control. The growing interest in such networks originates from their suitability for different types of application scenarios ranging from futuristic subscription-free civilian communication to present military-driven operations. Since there is no requirement for a fixed infrastructure, a sensor network can be composed of fixed and mobile wireless devices. Thus, such networks can be used in situations where either there is no other wireless communication infrastructure present or where such an infrastructure cannot be used because of military tactics, an emergency (as a result of a natural disaster or an enemy attack, e.g.), cost reasons, etc. The applications for wireless sensor networks are many and varied. They are used in commercial and industrial applications to monitor data that would be difficult or expensive to monitor using wired sensors. They could be deployed in wilderness areas, where they would remain for many years (monitoring some environmental variable) without the need to recharge/replace their power supplies. They could

form a perimeter about a property and monitor the progression of intruders (passing information from one node to the next). There are many uses for wireless sensor networks. Typical applications of wireless sensor networks include monitoring, tracking and controlling. Some of the specific applications are habitat monitoring, object tracking, nuclear reactor controlling, fire detection, traffic monitoring, etc. In a typical application, a wireless sensor network is scattered in a region where it is meant to collect data through its sensor nodes.

Despite the growing interest in wireless sensor networks over the past a few years, there are timely and emerging topics pertaining to such networks that have not been covered in sufficient depth in the literature and this Special Issue (SI) will provide readers with several well written papers addressing various important issues of wireless sensor networks.

We organised IEEE ICC 2006 Wireless Ad hoc and Sensor Networks Symposium, which was a great success and received a large number of high-quality submissions. In fact, ICC 2006 Wireless Ad hoc and Sensor Networks Symposium was the second largest one of all symposia in ICC2006 conference and also the only one which successfully finished all reviews before the review due day. Based on the success of this symposium, we were encouraged by the Editor-in-Chief of *International Journal of Sensor Networks (IJSNet)* to organise a Special Issue SI on 'Wireless Sensor Networks'. All submissions

to this SI are from ICC2006 accepted papers, which have been undergone sufficient enhancement (at least 30%) and a rigorous peer review process (at least three reviews were obtained). Based on the review results, this SI has accepted 10 papers out of more than 40 submissions. All 10 papers included in this SI address various important issues on wireless sensor networks. Due to the limited space, we should not reiterate their contents here, but rather we only give a list of them as follows:

- 1 Self-healing sensor networks with distributed decision making, Xiaojiang Du et al.
- 2 Design and Application of Enhanced Communication Protocols for Wireless Sensor Networks operating in Environmental Monitoring, Chiti et al.
- 3 A Flow-Based Reliability Measure for Wireless Sensor Networks, Hosam et al.
- 4 On Constructing Low Interference Topology in Wireless Sensor Networks, Kun-Da Wu and Wanjiun Liao.
- 5 Improving Gateway Safety in Wireless Sensor Networks using Cognitive Techniques, Waleed Youssef et al.
- 6 Implementation and Performance Evaluation of nanoMAC: a Low-Power MAC Solution for High Density Wireless Sensor Networks, Junaid Ansari et al.
- 7 Mining and Visualising Wireless Sensor Network Data Song Ci.
- 8 SUMP: A Secure Unicast Messaging Protocol for Wireless Ad Hoc Sensor Networks, Jeff Janies et al.
- 9 SHORT: Shortest Hop Routing Tree for Wireless Sensor Networks, Yang Yang et al.
- 10 Multiple-Input Turbo Code for Secure Data Aggregation and Source-Channel Coding in Wireless Sensor Networks, Hasan Cam.

Before ending this Guest Editorial, we want to express our deep appreciation to all authors who have submitted their papers to this SI in response to our call for papers. It was those quality contributions that have brought this SI a great success, as seen from the quality of this papers and importance of the topics covered, etc. Also, we would like to take this opportunity to thank all anonymous reviewers who have done a wonderful job in the peer review process, which has helped us to raise the quality of this SI substantially. Without their diligent work, the success of this SI is simply impossible. We would like also to thank the Editor-in-Chief of IJSNet, Dr. Yang Xiao, for his strong support to give us such a great opportunity to edit this SI. It was always a great pleasure to work with him. Also, our thanks should be directed to Mr. Yao Lin Tsao, who is the student of Professor Hsiao-Hwa Chen, Institute of Communications Engineering, National Sun Yat-Sen University, Taiwan. He had been working extremely hard to help in collecting all those invaluable review comments in a very timely manner from a great number of anonymous reviewers. His help with the review process ensures the great success of this SI. Finally, we hope that all readers will find this papers included in this SI informative and useful. Thank you very much!