## Editorial
# Wireless Ad Hoc Sensor Networks

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Wireless Ad Hoc Sensor Networks (WAdSNs) have become an important research area in the last ten years. Main contributions have focused on the development of new hardware, software, and protocols supporting distributed applications. In these kinds of networks, cooperation is a key issue, especially when nodes collaborate with their neighbors and with the whole network, considering it as a single entity. This paradigm can be used to face complex problems with high requirements: ease of deployment, self-configuration, and self-repair, among others. This special issue is among these sorts of applications.

Considering the point of view of network cooperation, the papers that form this special issue could be classified in four important categories.

The first category deals with routing purposes. Four papers could be included in this category.

The paper titled "*Energy-efficient routing algorithms based on OVSF code and priority in clustered wireless sensor networks,*" by X. Wu et al., describes an improved protocol based on the classic routing protocol LEACH. Different studies are done to analyze several environments where wireless sensor networks are deployed.

Another routing algorithm is proposed in the paper titled "*Energy-aware routing in wireless sensor networks using local betweenness centrality*", by X.-H. Li et al. This proposal uses local betweenness centrality to estimate the energy consumption of the neighborhood. The main goal is to provide balanced energy consumption in wireless sensor networks.

The results provided demonstrate that there exist several advantages using this algorithm.

The paper titled "*Towards efficient and secure geographic routing protocol for hostile wireless sensor network,*" by C. Lyu et al., proposes a new routing protocol, named ESGR, that exploits the geographic location, cryptography mechanisms, and broadcast wireless channel. The authors examine the impact of a wide variety of attacks in malicious wireless sensor network scenarios and demonstrate that ESGR avoids a specific variety of attacks and ensures high packet delivery rate in malicious sensor network environment.

The paper "*A credible routing based on a novel trust mechanism in ad hoc networks,*" by R. Feng et al., provides a novel routing algorithm for Mobile Ad hoc Networks (MANETs) focusing on finding paths in dynamic networks and considering security.

The second category deals with network formation and maintenance.

The paper "*A nonuniform sensor distribution strategy for avoiding energy holes in wireless sensor networks,*" by G. Ma and Z. Tao, presents a nonuniform sensor distribution strategy based on unequal cluster for WSNs whose main objective is to resolve the energy hole problem to improve the performance of multihop communications.

Another approximation to sensor network formation is described in "*A design approach for controlled self-organization-based sensor networks focused on control timescale,*" by D. Kominami and M. Murata. The authors propose and

evaluate a design for the network formation and maintenance supervised by control timescale.

The third category deals with network cooperation for data transport.

The paper "*Implementing a distributed WSN based on IPv6 for ambient monitoring,*" by D. F. Larios et al., evaluates different communication protocols distributed and centralized, in order to determine the best trade-off for environmental monitoring in different migratory areas of waterbirds. The results demonstrate that the use of fully distributed algorithms, such as IPv6 over WSNs, could be suitable for certain kind of cooperative applications.

A reliable collection protocol for aggregating data packets from all the sensor nodes to the sink in a large-scale WSN is presented in "*A reliable data collection protocol based on erasure-resilient code in asymmetric wireless sensor networks,*" by J.-J. Lei et al.

The paper "*Improved reliable trust-based and energy-efficient data aggregation for wireless sensor networks*", by C.-x. Liu et al., presents an improved, reliable, trust-based, and energy-efficient data-aggregation protocol for wireless sensor networks.

The fourth and last category deals with the security of the information. In this sense the last two papers included in the first category and the last one included in the third category could be understood also under the point of view of the security.

Another paper focused on security is presented in this special issue as an example of networking cooperation. This paper is titled "*On the security of certificateless signature schemes,*" by G. Sharma et al. The authors examine the use of certificateless public key cryptography in wireless sensor networks. The results prove that this security scheme has some vulnerabilities in front of certain kind of malicious attacks.

The papers included in this special issue deal with four important topics about Wireless Ad Hoc Sensor Networks. We hope that they can improve the design and development of this kind of networks.

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