

Editorial

Wireless Network Security

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Recent advances in wireless network technologies are growing fast, evidenced by wireless location area networks (WLANs), wireless personal area network (WPANs), wireless metropolitan area networks (WMANs), and wireless wide area networks (WWANs), that is, cellular networks. However, wireless network security is a major obstacle to successfully deploy these wireless networks. The effort to improve wireless network security is linked with many technical challenges including compatibility with legacy wireless networks, complexity in implementation, and practical values in real market. The need to address wireless network security and to provide timely, solid technical contributions establishes the motivation behind this special issue.

This special issue focuses on the novel and practical ways, but solid contributions, to improve the wireless network security. Specific areas of interest in WLANs, WPANs, WMANs, and WWANs include attacks, security mechanisms, security services, authentication, access control, data confidentiality, data integrity, nonrepudiation, encryption and decryption, key management, fraudulent usage, wireless network security performance evaluation, wireless link layer security, tradeoff analysis between performance and security, authentication and authorization for mobile service network, and wireless security standards (IEEE 802.11, IEEE 802.15, IEEE 802.16, 3GPP, 3GPP2).

Call-for-papers of this special issue received an overwhelming response from the research community. There were many paper submissions to this special issue. The submissions covered most aspects of areas of interest. Unfortunately, due to limited space and volume, only eleven papers were selected and included in this special issue. Let us briefly introduce the eleven accepted papers as follows.

The first paper entitled “A robust on-demand path-key establishment framework via random key predistribution for wireless sensor networks,” authored by Guanfeng Li et al., is about key management for wireless sensor networks using a ring of keys is randomly drawn from a large key pool.

The second paper entitled “SeGrid: a secure grid framework for sensor networks,” authored by Xiuzhen Cheng et al., proposes a secure framework for establishing grid keys in low duty cycle sensor networks, computing a shared key for two grids.

The third paper entitled “On optimizing compatible security policies in wireless networks,” authored by Scott C.-H. Huang et al., obtains the maximum number of security policies without conflicts and presents a polynomial-time approximation algorithm.

The next paper entitled “ZSBT: a novel algorithm for tracing DoS attackers in MANETs,” authored by Xin Jin et al., proposes a zone sampling-based traceback algorithm for tracing DoS attackers in MANETs.

The fifth paper entitled, “Multiple-channel security architecture and its implementation over SSL,” authored by Yong Song et al., proposes multiple-channel SSL architecture and protocol for protecting client-server communications.

The sixth paper entitled, “Key management for secure multicast over IPv6 wireless networks,” authored by Win Aye and Mohammad Umar Siddiqi, studies a key distribution scheme for secure multicast over IPv6 wireless networks, including securely distributing the group key and rekey messages for joining and leaving a mobile host in secure multicast group.

The seventh paper entitled “Integrating a trust framework with a distributed certificate validation scheme for

MANETs,” authored by Giannis F. Marias et al., studies ad hoc distributed OSCP for trust MANETs with possible threats, suggestions, and a TrustSpan algorithm.

The eighth paper entitled “Mutual image-based authentication framework with JPEG2000 in wireless environment,” authored by G. Ginesu et al., proposes an image-based authentication, and application scalability is provided through the JPEG2000 standard.

The ninth paper entitled “MAC security and security overhead analysis in the IEEE 802.15.4 wireless sensor networks,” authored by Yang Xiao et al., proposes a security overhead analysis for the MAC layer in the IEEE 802.15.4 wireless sensor networks, as well as a survey on security mechanisms, security vulnerabilities, and attacks.

The tenth paper entitled “Static and dynamic 4-way handshake solutions to avoid denial of service attack in Wi-Fi protected access and IEEE 802.11i,” authored by Floriano De Rango et al., proposes a solution for an extension of WPA and IEEE 802.11 with three static variants and with a resource-aware dynamic approach.

The eleventh paper entitled, “On the design of error correcting ciphers,” authored by Chetan Nanjunda Mathur et al., designs an error correcting cipher and proves bounds on its error correcting capacity as well as its security. In summary, all eleven papers included in this special issue have discussed wireless network security, and can serve as very useful references to the community.

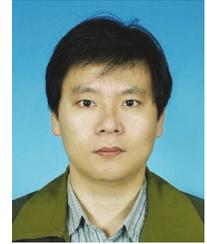
Last but not least, we would like to take this opportunity to express our thanks to all authors who submitted their papers to this special issue, as well as many reviewers’ constructive reviews which made the success of this special issue possible and ensured very high quality. Finally, we would like to express our gratitude to the editor-in-chief of this Journal, Dr. Phillip Regalia, and the publisher staff members for their cordial help throughout the publication process of this special issue.

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Yang Xiao had worked at Micro Linear as a MAC Architect involved in the IEEE 802.11 standard enhancement work before he joined the University of Memphis in 2002. He is currently with the Department of Computer Science of University of Alabama in 2006. He was a Voting Member of the IEEE 802.11 Working Group, from 2001 to 2004, and is an IEEE Senior Member. He currently serves as an Editor-in-Chief for International Journal of Security and Networks and for International Journal of Sensor Networks. He serves as an Associate Editor or on editorial board for five refereed journals. He serves as a Panelist for NSF, and a member of Canada Foundation for Innovation (CFI)’s Telecommunications expert committee. His research areas include wireless networks, mobile computing, and network security.



Yi-Bing Lin is the Chair Professor of the Department of Computer Science and Information Engineering National (CSIE) at National Chiao Tung University (NCTU) since 1995, and since 2002, he has been the Chair Professor of the Department of Computer Science and Information Management (CSIM), at Providence 2002, he has been the Chair Professor of the Department of Computer Science and Information Management (CSIM), at Providence University, a Catholic university in Taiwan. He also serves as a Vice President of the Office of Research and Development at the National Chiao Tung University. His current research interests include wireless communications and mobile computing. He has published over 200 journal articles and more than 200 conference papers. He is coauthor of the book *Wireless and Mobile Network Architecture* (with Imrich Chlamtac; published by John Wiley & Sons). He is an IEEE Fellow, an ACM Fellow, an AAAS Fellow, and an IEE Fellow.



Ding-Zhu Du is currently a Professor at the Department of Computer Science, University of Texas at Dallas. He has published more than 160 journal papers and 40 books. He is the editor-in-chief of Journal of Combinatorial Optimization and book series on network theory and applications. He is also in editorial boards of more than 15 journals. In 1998, he received CSTS Prize from INFORMS (a merge of American Operations Research Society and Institute of Management Science) for research excellence in the interface between operations research and computer science. In 1996, he received the 2nd Class National Natural Science Prize in China. In 1993, he received the 1st Class National Science Prize from Chinese Academy of Sciences. In 1992, the proof of Gilbet-Pollak conjecture was selected by 1992 Year Book of Encyclopaedia, Britannica, as the first one among six outstanding achievements in mathematics in 1991.

