Foreword

Cognitive Radio is considered as one of the main tools in combating the problem of spectrum availability in future mobile communications systems. It utilizes innovative technologies that increase the efficiency of spectrum usage, and therefore, solve the problem of bandwidth requirement for highly demanding applications. The shift towards digital TV and the latest developments in adaptive wireless technologies make it possible to fundamentally change the way radio spectrum is allocated and used. This is an outcome of a wide range of developments in the field of cognitive radio networks, including spectrum sensing, dynamic access of the possible transmission opportunities, increasing knowledge about the surrounding wireless environment through cognition systems, and managing network operations and charging systems. The momentum for application has also gained a further step forward with the latest LTE air interfaces and the application of different transmission power levels for the future green network. The innovations have not stopped the challenging changes in network design and the integration of femtocell stations into wider network deployments that employ cognitive communications.

The authors of Self-Organization and Green Applications in Cognitive Radio Networks have contributed a milestone to the evolution of cognitive radio networks with the publication of this book. Specifically, this book has marked the latest findings in emerging research topics. The participation of many experts from the mobile industry has marked the importance of this text with solid contributions towards the transition to a new era of applications in the field of wireless networks.

The assembly of state-of-the art contributions in this book gives a rich set of ideas that will potentially influence the development of efficient cognitive networks. However, the dynamic spectrum assignment has been achieved with flexible mobile terminals that can be reconfigured at all layers of the protocol stack. The key objective of this book is to deliver novel solutions to many issues that concern the deployment of cognitive radio communication networks. The book introduces the reader to new transparent concepts that involve designing/implementing cognitive radio systems and networks. Then, the book highlights how those concepts fit in real-world problems and applications. Hence, this book is an important reference for both professionals in industry and researchers in academia.

Besides addressing cognitive networks, the book also focuses on efficient resources allocation through the analysis of algorithms. These developments (at different layers) and newly proposed approaches consider cross-layer design and interference avoidance. The research scope of this book has been strengthened

further through the investigation of the latest standardizations in self-organizing cognitive radio networks. This book expands the scope of the power issues and other emerging cognitive user technologies, such as high altitude platform-supported cognitive radio systems. To summarize, this textbook stands at the forefront of current literature in the field of cognitive radio networks.

Abbas Jamalipour
University of Sydney, Australia

Abbas Jamalipour received the Ph.D. degree from Nagoya University, Nagoya, Japan. He is currently the Chair Professor of Ubiquitous Mobile Networking with the School of Electrical and Information Engineering, University of Sydney, Sydney, NSW, Australia. He is a Fellow of the Institute of Electrical and Electronics Engineers (IEEE), a Fellow of the Institute of Electrical, Information, and Communication Engineers (IEICE), and a Fellow of the Institution of Engineers Australia, an IEEE Distinguished Lecturer, and a Technical Editor of several scholarly journals. He has been an Organizer or the Chair of several international conferences, including the IEEE International Conference on Communications and the IEEE Global Communications Conference, and was the General Chair of the 2010 IEEE Wireless Communications and Networking Conference. He is the Vice President – Conferences and a Member of the Board of Governors of the IEEE Communications Society (ComSoc). He is the recipient of several prestigious awards, including the 2010 IEEE ComSoc Harold Sobol Award for Exemplary Service to Meetings and Conferences, the 2006 IEEE ComSoc Distinguished Contribution to Satellite Communications Award, and the 2006 IEEE ComSoc Best Tutorial Paper Award.