Guest Editorial
Future Wireless Systems

This special issue of the JOURNAL OF COMMUNICATIONS SOFTWARE AND SYSTEM dedicated to Future Wireless Systems aims to provide the reader with an insight into interesting parts of the work that has been carried out in the areas of communication systems, networks and protocols. In particular, this issue tries to highlight the main challenges, regarding emerging wireless technologies for wireless and mobile communications. Of course, integration between heterogeneous wireless networks as a particularly important topic is addressed, too. Fourteen papers have been submitted and six of them have been recommended for publication based on the standard reviewing process.

Three of the proposed papers address the area of wireless systems. In "Adaptive Turbo-Coded Hybrid-ARQ in OFDM Systems over Gaussian and Fading Channels" by Kingsley et al., an analytical approach to spectral efficiency maximization of coded wideband transmissions is presented. The proposed approach, designed for an OFDM system, exploits Type-III Hybrid-ARQ. The effects of imperfect sub-channel estimation are characterized and compensated for during code rate and signal constellation optimization. The results have shown that an adaptive approach based on OFDM and Type-III Turbo Hybrid-ARQ is able to maximize the spectral efficiency for wideband channels.

In "Multi-code Multicarrier CDMA: Performance Analysis" by Taeyoon et al., a novel multi-code multicarrier code division multiple access system is proposed and analyzed for a frequency selective fading channel. The defined scheme can support variable data rates for a large number of users in future cellular systems without increasing the interference. The analytical and simulation results have shown that the proposed system clearly outperforms multicarrier CDMA and single carrier multi-code CDMA in terms of bit error probability and user capacity in a frequency selective Rayleigh fading channel. This makes the proposed system suitable for next generation cellular systems.

In "Method for Minimizing Total Generalized Squared Correlation of Synchronous DS-CDMA Signature Sequence Sets in Multipath Channels" by Cotae et al., symbol-synchronous CDMA systems in the presence of colored noise are analyzed. The Total Generalized Squared Correlation (TGSC) for a given signature sequence set has been characterized. A definition of the TGSC based on the eigenvalues of Gram matrix associated to signature sequences set for multipath channels has been illustrated. Furthermore, a method for minimizing TGSC in multipath channels in the presence of the colored noise has been proposed.

The last three papers address the area of wireless communication networks and protocols. In "Mobile IP Address Efficiency" by Zhen et al., a novel address-sharing mechanism has been designed in which an address that has already been assigned to one Mobile Node can be re-assigned to another. The poposed method provides high address efficiency. It can be used in Mobile IP protocol to save IPv4 public addresses in both Mobile IPv4 and Mobile IPv6 interoperating with IPv4 hosts scenarios, but also as a general IPv6/IPv4 transition technique.

In "Study of Power Consumption in a Cooperative Wireless Network" by Emamian, a comparison of the average amounts of power consumed by nodes between a standard wireless network that uses single-hop transmission and a cooperative wireless network that uses two-hop transmission has been carried out. It is well known that when the channel between two nodes, source and destination, is in a deep shadow-fading state, increasing the transmission power at the source can be power consuming and result in interference for other co-channel receivers. The authors have shown that, in these channel conditions, a solution based on a cooperating node may be useful. The proposed protocol selects the cooperating node, so that it has the best propagation channel to the destination node. The goal of this paper is to show that although an extra node becomes involved in transmitting the packets, the total average power consumed in the cooperative network is lower than that of a standard wireless network.

In "An Experimental Cross-Layer Approach to Improve the Vertical Handover Procedure in Heterogeneous Wireless Networks" by Garroppo et al., a new cross layer mechanism, called Interface Management Module, able to improve the handover decision procedure and suitable for the MIPv6 has been developed. The proposed mechanism provides the users of next generation wireless devices the possibility to move across a heterogeneous network environment whilst still exploiting the best connection to the global Internet. The authors have set up an experimental test bed and tested their algorithm using a realistic scenario. The results of the experimental evaluation have shown a noteworthy reduction in the handover latency.

Finally, the Editors sincerely hope that this special issue of JCOMSS provides an interesting selection of research work in the areas of wireless systems and networks. We would like to thank all the authors who submitted their papers and thank all the reviewers for their efforts and valuable contributions.

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His research and teaching activities involve computer architecture, computer networks and distance learning. He has published a number of papers and books within these areas. He has coordinated or participated in several large national and international projects (Med-Campus Project of EU, Interactive Satellite multimedia Information System – ISIS in ACTS of EU, ESA SkyNet and ESA MODUS). Furthermore, he coordinates and manages industrial research projects with Alenia Spazio S.p.a. and ST Microelectronics. The main areas of the research group he coordinates include: modelling and performance analysis, mobile Internet, power saving in IEEE 802.11e, and IEEE 802.16e.

Dr. De Blasi has been a Chair of a Symposium on Future Wireless Systems which has been organized as a part of the Conference on Software in Telecommunications and Computer Networks (SoftCOM) since 2000.

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Her department is responsible for developing next generation wireless technologies for integration in the future company's System-on-Chip platforms. Enrica Filippi holds a M.S and Ph.D. in Computer Science from Politecnico of Torino (Italy), and is coauthor of several papers and patents. Current main interests of the research group she coordinates are: advanced very high datarate OFDM(A) and MIMO systems, reconfigurable digital baseband architectures, cognitive radio systems, wireless networking protocols. Her team is also activey involved in the definition of new wireless standards at IEEE and 3GPP. Before joining STMicroelectronics in 2001, she has been working at Telecomitalia Research Labs for 7 years, joining the HW technology department first, and then the advanced Access Network departement.

Dinko Begusic received the B.S. degree in electrical engineering from the University of Split, Croatia and the M.S. and Ph.D degrees in electrical engineering from the University of Zagreb, Croatia, in 1988 and 1992, respectively. Since 1985, he has been with the University of Split, Croatia, where he is currently a Professor and the Dean of the Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture (FESB). From September 1990 to June 1991, he was a visiting researcher with the Universite Libre de Bruxelles, Bruxelles, Belgium. From February through July 1992, he was visiting researcher with the King's College London, London, UK. From September 1997 until May 1998, he was with the University of Texas at Dallas, Richardson, TX, as a Visiting Assistant Professor. His research interests include communication systems, mobile communications, digital signal processing for communications, and adaptive algorithms.

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