Special Issue on Advanced Wireless Technology

Guest Editorial

Wireless communications has penetrated many aspects of our day-to-day life. Often invisible, like a *deus ex machine*, taken for granted. We even have a word for it – wireless communications is ambient. This view on wireless communications has an association of being amazed, some people call it a WOW!-factor. But the other side of the medal is that we expect that the 'magic' is always there, like water, electricity. Apart from the fact that with the current debate about natural resources, this comparison is getting somewhat uneasy, we clearly notice that many of us got clearly addicted, and as a result, 'we' claim "always on, everywhere". This level of availability, preferably in a durable way, has not been realised. And new mottos pop up – "any device, any network": as a user, we really don't want to be bothered. Hide it, behind the wall-paper, woven in our clothes, as long as we're not bothered! This type of requirement poses serious challenges to technology; this is not just 'changing some bits and pieces'.

The European Microwave Week, including the European Wireless Technology (EuWiT) Conference, has every year a kaleidoscopic set of workshops, regular as well as focused sessions, and invited papers, showing the richness of the field. In 2008, the theme was "Bridging Gaps". Gaps that exist between state-of-the-art technology, and challenging requirements posed in an ever increasing number of application areas. Gaps between scientific rigour, and the pragmatic reality. During this week, these gaps get 'faces' – real people working at both sides, and taking pains to bridge the various gaps. This network of people is, to our opinion, one of the most valuable aspects of this conference.

This year, Journal of Communications (JCM) has offered EuWiT the opportunity to publish a selected number of its accepted papers, and we have accepted this opportunity gratefully. The title of this special issue is: *Advanced Wireless Technology*. The two regular papers immediately show the width of the field, and of the conference.

The contribution of MacCurdy et al. is on the border of life sciences (ornithology) and electrical engineering, when they present a new method for tracking animals using a terrestrial system similar to GPS. The challenges in this field are clearly weight of the device, its cost, and its performance in extremely crowded and diverse conditions. Taking away the specific application, the results of MacCurdy may be applied also in other fields, where tracking is a key aspect, and where similar challenges exist: logistics, crowd-control, food-chain-control, ….

The paper by Karamehmedović et al. on the other hand addresses the topic of modulation techniques for future wireless systems. Currently the similarity between next generation wireless systems (e.g. 802.11n, mobile WiMax, LTE) lies in the use of OFDM and MIMO. The authors address the weaknesses of OFDM, and discuss the use of wavelet-based modulation, a technique that might be a candidate for the fifth generation wireless systems. Specific attention is paid to the performance of wavelet-based transceivers in the presence of analogue radio frequency front-end imperfections.

The invited (overview) paper is from Miyake. Dr Miyake reviews the progress in wireless communications, and the way innovations in various technological fields are brought together into candidates for standardisation. A particular observation is that quite some industry fora and standardisation bodies create application area-specific work groups, like health, or industry. Another issue addressed in his paper is the essential role of wireless communications in the networked knowledge society in the 21st century, the point which nicely supports the idea of this Special Issue. Enjoy the reading!

Guest Editors
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Homayoun Nikookar received his Ph.D. in Electrical Engineering from Delft University of Technology (TUDelft), The Netherlands, in 1995. He is an Associate Professor at the International Research Centre for Telecommunications and Radar (IRCTR) of the Department of Electrical Engineering, Mathematics and Computer Science of TUDelft. He is also the leader of the Radio Advanced Technologies and Systems (RATS) program of IRCTR, leading a team of researchers carrying out cutting edge research in the field of radio transmission. He has conducted active research in many areas of wireless communications, including wireless channel modeling, UWB, MIMO, multicarrier transmission, Wavelet-based OFDM and Cognitive Radio. He is the co-recipient of the 2000 IEEE Neal Shepherd Best Propagation Paper Award for publication in the March issue of Transactions on Vehicular Technology. Dr Nikookar is also recipient of several paper awards of International Conferences and Symposiums. In 2007 he served as the Chair of the 14th IEEE Symposium on Communications and Vehicular Technology (SCVT) in Benelux and in 2008 was the Chairman of the European Wireless Technology (EuWiT) Conference in Amsterdam. Dr. Nikookar is a Senior Member of the IEEE and the coauthor of the book, *Introduction to Ultra Wideband for Wireless Communications*, Springer, 2009.

Erik Fledderus received a PhD in Applied Mathematics in 1997. Since then he has worked at KPN Research, and later on at TNO Information and Communication Technology on various topics, including radio propagation modelling, capacity enhancement techniques in cellular networks and multi-user detection in UMTS.

He initiated and lead the European project Momentum in the area of UMTS radio planning and simulation from 2001-2003, and the Dutch project Broadband Radio@Hand on smart antennas, MIMO and next generation WLAN/UMTS from 2001-2005.

Since March 1st, 2003, Erik is part-time professor at the Eindhoven University of Technology in the field of Wireless Communication Networks, with a specialization towards cognitive networks.

Within TNO he is program manager of the program Future Internet Use, and senior strategist on mobile and wireless technology in general, and innovation and technology management.