The 79th IEEE
Vehicular Technology Conference

Final Programme

18 – 21 May 2014

Seoul, Korea

Welcome from the General Chair

Dear Colleagues,

On behalf of the organizing committee of VTC2014 Spring in Seoul, I welcome you all to this stimulating city of vibrant people and advanced technologies of a connected society.

It has been a decade since IEEE VTC2003 Spring was held in Jeju, Korea when the major theme was the emerging technologies for 4G. Then, we struggled with the advent of 3G systems deployment. We experienced shortage of radio resources for very reliable, high rate multimedia traffic required by the applications on smart phones. Recently, mobile communication system development and research activities for 5G have been initiated by many regional initiatives with support from government, industry and academia. Potential areas of applications such as connected cars, remote healthcare, and augmented reality can expedite the 5G systems research and development.

We express sincere appreciation to all of our colleagues for their concerted efforts, to all of the authors who submitted their valuable research contributions that will lead very fruitful discussions, and to all of the participant's efforts to make this conference a success.

We hope that you will enjoy the technical in-depth presentations and discussions of state-of-the-art technologies during this prestigious conference. We also hope that you will enjoy and feel the coexistence of the past and present Korean culture, the mingled eastern and western cultures and our presentations of the future technologies.

Youngnam Han,
General Chairman, IEEE VTC2014-Spring

Welcome from the TPC Co-chairs

On behalf of the Technical Program Committee (TPC), we warmly welcome you to the 79th IEEE Vehicular Technology Conference (VTC) in the historical and modernistic city of Seoul, Korea.

The committee has organized exciting programs for IEEE VTC2014-Spring wireless communication and vehicular technology with conference themes of "Extending Wireless Communication Horizon" and "IT Convergence for the Future". These themes cover the latest topics such as 5G mobile communications, Internet of Things (IoT), super Wi-Fi and V2V/V2I.

The technical program consists of 75 technical oral sessions in 13 tracks. The conference track chairs have selected 375 outstanding papers for the oral sessions. In addition to the oral sessions, we present three workshops, two keynote presentations and several tutorials introducing some of the latest advances in wireless communication and IT convergence. The creation of this impressive program would not be possible without the voluntary support from an outstanding team of colleagues that we thank sincerely.

Special thanks go to the conference track chairs who have organized a very efficient and smooth review and session organization process, as well as the workshop, panel and tutorial chairs that have organized very informative sessions. We also thank all the TPC members and reviewers for their professional and timely review of technical contributions. Of course, making a successful technical conference would not have been possible without the participation from authors, to whom we express our gratitude for presenting and sharing their ideas and contributions with our community. We also thank the IEEE VTC2014-Spring organizing committee for their support.

We are pleased to meet with you here in Seoul and to share the many excellent presentations and networking opportunities.

Seong-Cheol Kim and Saewoong Bahk,
TPC Co-chairs, IEEE VTC2014-Spring

Welcome from the VTS President

On behalf of the IEEE Vehicular Technology Society, it is my pleasure to invite you to the IEEE 79th Vehicular Technology Conference in Seoul.

By attending VTC 2014 Spring, you will join researchers from all over the world who will converge to Seoul to network and exchange ideas on the latest advances in the fields of wireless, mobile, and vehicular technology. An international vehicular technology hub, Seoul forms the perfect backdrop for these encounters. I hope you will also be able to take advantage of the beautiful Spring season in Seoul, and that you will have the opportunity to enjoy the richness of this millennia-old city.

For over sixty years this flagship conference of the IEEE Vehicular Technology Society has been bringing together individuals from academia, government, and industry around the themes of wireless, mobile, and vehicular technology. Since 1999, VTC has been held twice a year: in North America, and rotating between Europe and the Asia-Pacific region, increasing accessibility to the conference experience throughout the world. Held in Las Vegas in September 2013, it will move to Vancouver in Canada in the fall of 2014.

My sincere thanks go to the organizing committee, and in particular to the General Chair Youngnam Han, and Technical Program Chairs Seong-Cheol Kim and Saewoong Bahk, along with their respective teams. They have been assembling an exciting and stimulating program of technical sessions, plenaries and workshops, which will expose you to the latest developments in wireless and mobile technology, but also in emerging areas of vehicular technologies.

I wish you a wonderful experience in this conference, where you will meet your existing collaborators and hopefully build new relations.

Fabrice Labeau, *President*
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Registration will take place in the Grand Ballroom Foyer. Opening times are:

- Sunday 18 May 2014 07:00 - 17:30*
- Monday 19 May 2014 07:00 - 17:00
- Tuesday 20 May 2014 08:00 – 17:30
- Wednesday 21 May 2014 07:30 – 15:30

* Also after 17:30 on Sunday, you may pick up your badge and tickes at the reception door – bags can be picked up on Monday. (**Your registration receipt will be needed to pick up your registration at the reception.**)

Breaks

Coffee breaks will take place with exhibits in the Grand Ballroom Foyer.

Social Events

All the social events will be held in the Grand Ballroom. A ticket is required for entry. The reception will be on Sunday evening, and there will be a banquet on Tuesday evening.

Lunches, the reception and banquet require admission tickets and these are included in your registration packet to gain entry. You also may purchase tickets for these events at the conference registration desk.

Industrial Session

Delegates are invited to an Industrial Session run by National Instruments.

21 May 2014, 13:30-15:00 Studio 10

Paving the Way to 5G Wireless: Rapid Prototyping

Jaeweon Kim, Scientific Research Segment and Lead User Program, National Instruments

The surprisingly rapid deployment of the Long-Term Evolution (LTE) system and ever increasing demand for capacity is driving the world towards the 4th Generation (4G) wireless service, the LTE-Advanced (LTE-A). Researchers have already started to study the next generation wireless communication services, namely 5th Generation (5G). The faster a researcher can transition a concept from design to a working prototype, the faster all of the world ultimately benefits.

This session will focus on the current and future technical challenges towards 5G such as novel waveform design, massive MIMO and mmWave. We will consider efforts to advance 5G technologies with techniques such as Software Defined Radio (SDR), using as an example NI's prototyping platform developed in collaboration with top wireless researchers in the industry and academia.

An overview of the challenges encountered in the various stages of the implementation including new algorithms from simulation and high throughput baseband design to modeling will be discussed.

The benefits to the research community of prototyping in hardware vs. simulating only in software also will be discussed. Finally, we will conclude the talk by introducing one of the latest SDR prototyping platforms that will pave the way to the 5G.

Jaeweon Kim received the B.S. and M.S. in Electrical Engineering from Korea Advanced Institute of Science and Technology (KAIST) in 1994 and 1996 respectively, and Ph.D. in Electrical and Computer Engineering from the University of Texas at Austin in 2011.

From 1996 to 2002, he was an associate research engineer at the R&D Center of SK Telecom, Seoul, Korea, where he was working for 2G and 3G code division multiple access (CDMA) systems and their applications. He received the patent champion of the year in 1998 and the excellent employee award in 2001. During his Ph.D. program, he held a member of technical staff position at Bandspeed, Inc., Austin, TX from 2006 to 2008 and senior member of technical staff position at MediaExcel, Inc., Austin, TX from 2008 to 2011. Currently he is with National Instruments, Austin, TX as a senior wireless platform architect.

Dr. Kim was awarded Information and Telecommunication National Scholarship by Ministry of Information and Communication (MIC), Korea from 2002 to 2005. His current research interests include cognitive radio, next generation wireless communications, digital signal processing and prototyping.

Plenaries

Monday 19 May 2014, 9:00–10:00 (Ballroom)

Global ICT Outlook

Jae W. Byun *CTO SK Telecom*

Due mainly to the technological evolution and the rise of innovative ideas, the ICT ecosystem is evolving rapidly from its traditional 'Content – Platform – Network – Device' value chain, as 'convergence with neighboring industries' is becoming a new major trend. Smartphone has been the main driving force and the vanguard of such change. With the saturation of high-end Smartphone market, what used to be a competition of devices and OS capability is slowly turning into a competition of service innovation and next-gen devices.

In 2014, the global ICT market is expected to face six key trends in service innovation and next-gen devices. Trends in service innovation are the

(1) Rise of communication services by Apple and Google,

(2) Booming of context-aware personalization services, thanks to the improvements in personalization S/W and situational awareness sensors,

(3) Beginning of online-offline smart shopping services initiated by Apple's iBeacon technology and

(4) Expansion of media platform alliances for market leadership, as well as strengthening of media strategy by Apple and Google.

Trends in next-gen device are

(5) Apple's entrance into Smart Vehicle ecosystem with CarPlay, and

(6) Competition in wearable devices is not as independent devices, but as supplementary devices for Smart phones.

In the Network industry, LTE is expanding around the world to become a mainstream service, and discussions about 5G are just about to start. Previous network evolution from 1G to 4G were initiated by technological development creating generation gaps. Another such breakthrough is expected for 5G evolution, but current advancement in telecommunication technology makes it difficult to predict where such breakthrough would take place. Based on previous experiences, Small Cell is being considered as one of the potential breakthrough technologies in reaching a 1000x capacity increase by 2020.

Dr. Jae Byun is the CTO of SK Telecom, and Chairman of Next Generation Mobile Network Alliance. He has over 20 years of experience in the telecommunication and information technology industries. Since he joined SK Telecom in 1993, he has held a wide range of management positions in R&D, network engineering and planning divisions. He received 'CDG Industry Leadership Awards' in 2002 for his contribution toward successful commercialization of CDMA technologies. After leading a full-fledged WCDMA commercial service launch in 2007, he was elected as a NGMN board member in 2008, and as a chairman of the board in 2012.

Dr. Byun led the LTE commercial launch in 2012, and later won 'Outstanding LTE Contribution Award' in Mobile World Congress and 'Most Significant Development of a Commercial LTE Network Award' in LTE World Summit 2013. In 2010 and 2011, he led a series of SK Group-level technology-based business development projects at SK Holdings.

Tuesday 20 May 2014, 9:00–10:00 (Ballroom)

5G Vision/Requirements and Key Technologies

Kyungwhoon Cheun *Senior Vice President Samsung Electronics*

The race to search for innovative solutions to enable the Next Generation Mobile Communications (5G era) has recently begun worldwide. In early 2013, the European Commission announced that it would invest €50 million in 2013 for 5G research in multiple projects such as METIS, quickly followed by the formation of the Chinese Government-led IMT-2020 Promotion Group in February 2013, the initiation of the Korean Government-led 5G Forum in May 2013, and the formation of 2020 and Beyond Ad-hoc within ARIB (Association of Radio Industries and Businesses), Japan, in October, 2013. While the standardization of 5G specifications in standards bodies such as the Third Generation Partnership Project (3GPP) and the formal ratification of 5G standards by the International Telecommunication Union (ITU) are still several years away, many share the vision of targeting 2020 for the initial commercialization of 5G cellular with drastically enhanced user experience.

This talk presents the vision, requirements, and the key technologies envisaged for the 5G mobile communications in 2020 and beyond era. The requirements emerged for the 5G era include massive capacity with order of magnitude data rate improvement as well as uniform Gbps experience, reduced latency for delay sensitive services, massive connectivity supporting innumerable simultaneous connections, and all these demands with energy efficient as well as cost effective solutions. The talk will put forth a few key technologies ranging from air technologies and network design to services along with the recent R&D achievements proving the feasibility of the proposed technologies and showing a bright prospect of 5G.

Dr. Kyungwhoon Cheun received his B.S. in Electronics Engineering from Seoul National University in 1985. He earned is M.S. and Ph.D. degrees from the University of Michigan, Ann Arbor in 1987 and 1989, respectively. He was an assistant professor at University of Delaware from 1989 to 1991 and joined the Pohang University of Science and Technology (POSTECH) in 1991 where he is currently a full professor. At POSTECH, he headed the national ITRC center for Broadband OFDM Multiple Access (BrOMA), an 8 year research program supported by the Korean Ministry of Knowledge and Economy. Dr. Cheun has also served as an engineering consultant to numerous industry and was on leave at Witechs and NSystems in San Diego where he developed efficient receiver algorithms for the IEEE802.11 based WLANs and WCDMA. Aside from his academic duties, he served as the Chief Technical Officer (CTO) for Pulsus Technologies Inc. during 2004 to 2011, a Qualcomm partner company where he was in change or developing sound processing algorithms and sigma-delta modulation based full digital audio amplifier SoCs. Since 2012 he has been with Samsung Electronics DMC R&D Center as a senior vice president and leads the Communications Research Team in the area of next generation cellular and Wi-Fi networks.

Panels

Monday 19 May 2014, 18:00–20:00 (Ballroom)

5G Wireless

Moderator:	**Nak-Myeong Kim**	*VP for Information and Communications, Ewha Womans University*
Panelists:	**Youngnam Han**	*Chairman of 5G Forum Korea, KAIST, Korea*
	Ed Tiedemann	*Senior Vice President of Engineering, Qualcomm, USA*
	Gerhard P. Fettweis	*Technical University of Dresden, Germany*
	Chih-Lin I	*Chief Scientist, Wireless Technologies, China Mobile Research Institute*
	Akira Matsunaga	*Vice leader of the ARIB 2020 & Beyond Ad Hoc, KDDI Corporation*
	Maziar Nekovee	*Head of European 5G Research, Samsung UK*

To cope with the massive increase in demand for services, new ways of thinking of mobile provision are required. This demand will have to be met by '5G', which is something of a moving target as the world starts to deploy 4G systems. To look at the future shape of '5G', we have brought together industry leaders and academics from the USA, Europe and Asia to give their views on candidate technologies, research programs, and even whether we will be able to talk of '5G' as a recognizable system.

Professor Nak-Myeong Kim is Vice President for Information and Communications, Ewha Womans University. A full biography was not available at time of going to press.

Professor Youngnam Han (ynhan@kaist.ac.kr) received his B.S and M.S. in Electrical Engineering from Seoul National University in 1978 and 1980, respectively. He received his Ph.D. from the University of Massachusetts, Amherst in 1992. He had been working as a principal engineer at ETRI during 1992 to 1997 managing the project of design and performance analysis of radio transmission technology for DCN, PCS and IMT2000. He was actively engaged in R&D for IS95 digital cellular system in Korea deployed nationwide in 1995 and as a member for IMT2000 standards activities as a delegate at ITU-R representing Korea. He joined ICU as a faculty since 1998, and was a principal engineer at Qualcomm, Inc. San Diego during 2001~2001, where he worked on the standards cdma20001xEV. He had been served many conferences as a TPC member and organizing chairs. And TPC chair for VTC2003 Spring. He had been a Chairman of BoG, IEEE VTS APWCS (Asia Pacific Wireless Communication Symposium) during 2009~2010. He will serve as a general chair for VTC2014 Spring in Seoul. He is currently with the Department of Electrical Engineering at KAIST as a Professor. His research interests include performance evaluation of mobile communication systems, radio resource management, optimization of mobile systems operations and cognitive radio systems. He is a recipient of a best paper Award in IEEE VTC2000-Spring, Tokyo. He is a life-long member of KICS, and a senior member of IEEE. Since June 2013, He has been working as Chair, Steering Committee, 5G Forum in Korea.

Ed Tiedemann is Senior Vice President of Engineering, Qualcomm, USA. A full biography was not available at time of going to press.

Professor Gerhard P. Fettweis earned his Ph.D. under H. Meyr's supervision from RWTH Aachen in 1990. Thereafter he was at IBM Research and then at TCSI Inc., California.

Since 1994 he is Vodafone Chair Professor at TU Dresden, Germany, with main research interest on wireless transmission and chip design. He is an IEEE Fellow and an honorary doctorate of TU Tampere. As repeat entrepreneur he has co-founded 11 startups so far.

He has setup funded projects in size of close to EUR 1/2 billion, notably he runs the German science foundation's CRC HAEC and COE cfAED. He is actively involved in organizing IEEE conferences, e.g. TPC Chair of ICC 2009 and TTM 2012, General Chair of VTC Spring 2013 and DATE 2014.

Dr. Chih-Lin I is the China Mobile Chief Scientist of Wireless Technologies, in charge of advanced wireless communication R&D effort of China Mobile Research Institute (CMRI). She established the Green Communications Research Center of China Mobile, spearheading major initiatives including 5G Key

Technologies R&D; high energy efficiency system architecture, technologies, and devices; green energy; C-RAN and soft base station.

Dr. I received her Ph.D. degree in Electrical Engineering from Stanford University, has almost 30 years experience in wireless communication area. She has worked in various world-class companies and research institutes, including wireless communication fundamental research department of AT&T Bell Labs; Headquarter of AT&T, as Director of Wireless Communications Infrastructure and Access Technology; ITRI of Taiwan, as Director of Wireless Communication Technology; Hong Kong ASTRI, as VP and the Founding GD of Communications Technology Domain.

Dr. I received the Trans. COM Stephen Rice Best Paper Award, and is a winner of CCCP "National 1000 talent" program. She was an elected Board Member of IEEE ComSoc, Chair of ComSoc Meeting and Conference Board, and the Founding Chair of IEEE WCNC Steering Committee. She is currently an Executive Board Member of GreenTouch, and a Network Operator Council Member of ETSI NFV.

Akira Matsunaga is Vice leader of the "2020 and Beyond Ad Hoc" (20B AH), established by the Association of Radio Industries and Businesses (ARIB), Japan, to study terrestrial mobile communications system in 2020 and beyond. He is employed by the KDDI Corporation, and heads the Service and System Concept Working Group within 20B AH. A full biography was not available at time of going to press.

Dr Maziar Nekovee is a Chief Engineer at Samsung Electronics R&D Institute UK (SRUK), where he leads Samsung's European research and collaborations in the next generation of mobile communication networks (5G). Prior to joining Samsung he was with British Telecom (BT), where he pioneered and led research in cognitive radio/spectrum sharing technologies, as well as providing technical consultancy the company's lines of business on mobile strategy, including UK's 4G spectrum auction.

He has a PhD in theoretical and computational physics and a first degree and MSc. in electrical engineering (cum laude) both obtained in the Netherlands. He has published over 80 peer-reviewed papers, two books, and has several patents. His current focus is on research and development of disruptive wireless technologies and systems for 5G, including advanced mmWave communications for extremely high bandwidth 5G applications, and novel approaches to scalable and efficient resource sharing in ultra-dense small cell networks.

Samsung is at the forefront of global research and innovation effort on 5G technologies, and has supported Horizon 2020 Advanced 5G Network Infrastructure for Future Internet PPP (5G PPP), a 1.4 Billion Euro joint initiative between the ICT industry and the European Commission to research and create 5G's communication networks and services. Dr Nekovee is responsible for Samsung's overall involvement in 5G PPP research activities, and is elected representative for the device terminal and smart card sector in the 5G Infrastructure Association, http://5g-ppp.eu/.

Tutorials

A range of tutorials will be held throughout the conference given by experts from industry and academia.

Sunday, 18 May 2014, 8:30–12:00 Studio 1

T1: Heterogeneous Cellular Networks: Modeling, Analysis and Design using Stochastic Geometry

Tony Q. S. Quek, Singapore University of Technology and Design; Marios Kountouris, Supélec, France

With the increase in data traffic driven by a new generation of wireless devices, data is expected to overwhelm cellular network capacity in the future. Heterogeneous cellular networks are a comprehensive approach to provide high cellular network capacity by overlaying conventional macrocell cellular architecture with heterogeneous architectural features such as small cellular access points (picocells and femtocells), low-power fixed relays, and distributed antennas. Heterogeneous cellular networks are expected to achieve higher data rates and better coverage by exploiting spatial reuse, while retaining at the same time the seamless connectivity and mobility of cellular networks. Inspired by the attractive features and potential advantages of heterogeneous cellular networks, their development and deployment is gaining momentum in the wireless industry and research communities during the last few years. It has also attracted the attention of standardization bodies such as 3GPP LTE-Advanced. However, heterogeneous cellular networks also come with their own challenges, and there are significant technical issues that still need to be addressed for successful rollout and operation of these networks. One of the main challenges is interference management and this tutorial will present a stochastic-geometry based approach to understand such interference and better design heterogeneous cellular networks

Tony Q. S. Quek received the B.E. and M.E. degrees in Electrical and Electronics Engineering from Tokyo Institute of Technology, respectively. At MIT, he earned the Ph.D. in Electrical Engineering and Computer Science in 2008. Currently, he is an Assistant Professor with the Information Systems Technology and Design Pillar at Singapore University of Technology and Design (SUTD). He is also a Scientist with the Institute for Infocomm Research. He is currently an Editor for the IEEE Transactions on Communications and the IEEE Wireless Communications Letters. He was Guest Editor for the IEEE Communications Magazine (Special Issue on Heterogeneous and Small Cell Networks) in 2013, and the IEEE Signal Processing Magazine (Special Issue on Signal Processing for 5G Evolution) in 2014. He was honored with the IEEE Globecom 2010 Best Paper Award, the 2012 IEEE William R. Bennett Prize, and the 2013 IEEE SPAWC Best Student Paper Award. He is a senior member of the IEEE.

Marios Kountouris received the Diploma in Electrical and Computer Engineering from the National Technical University of Athens, Greece in 2002 and the M.S. and Ph.D. degrees in Electrical Engineering from the École Nationale Supérieure des Télécommunications (ENST) Paris, France in 2004 and 2008, respectively. His doctoral research was carried out at Eurecom Institute, France, and it was funded by Orange Labs, France. From February 2008 to May 2009, he has been with the Department of ECE at The University of Texas at Austin as a research associate, working on wireless ad hoc networks under DARPA's IT-MANET program. Since June 2009, he has been an Assistant Professor at the Department of Telecommunications at Supélec (Ecole Supérieure d'Electricité), France. He is currently an Editor for the EURASIP Journal on Wireless Communications and Networking. He received the 2013 IEEE ComSoc Outstanding Young Researcher Award for the EMEA Region, the Best Paper Award in Communication Theory Symposium at the IEEE Globecom conference in 2009, the 2012 IEEE SPS Signal Processing Magazine Award, and the IEEE SPAWC 2013 Best Student Paper Award. He is a Member of the IEEE and a Professional Engineer of the Technical Chamber of Greece.

Sunday, 18 May 2014, 13:30–17:00 Studio 1

T2: 4G & Beyond: LTE & LTE-Advanced

Hyung G. Myung, Qualcomm, USA

The current 3rd generation (3G) cellular wireless systems are evolving into 4th generation (4G). As a pathway to 4G, 3GPP developed Long Term Evolution (LTE). In terms of air interface techniques, LTE system uses OFDMA-based multicarrier modulation, MIMO techniques, and other advanced features to greatly improve the mobile wireless services. In this tutorial, we first survey the underlying techniques of the 4G systems such as OFDMA, SC-FDMA, MIMO, and fast multi-carrier resource scheduling. Then, we give technical overview of LTE and LTE-Advanced. We also survey upcoming beyond-4G technologies.

Dr. Hyung G. Myung is currently with Qualcomm, San Diego, USA since 2007. He received the B.S. and M.S. degrees in Electronics Engineering from Seoul National University, South Korea in 1994 and in 1996, respectively, and the M.S. degree in Applied Mathematics from Santa Clara University, California in 2002. He received his Ph.D. degree from the Electrical and Computer Engineering Department of Polytechnic University (now part of NYU), Brooklyn, NY in January of 2007. From 1996 to 1999, he served in the Republic of Korea Air Force as a lieutenant officer, and from 1997 to 1999, he was with Department of Electronics Engineering at Republic of Korea Air Force Academy as a faculty member. Before joining Qualcomm, he held research and development positions at ArrayComm, Samsung Advanced Institute of Technology, and InterDigital Communications. He is the co-author of the book Single Carrier FDMA: A New Air Interface for Long Term Evolution (2008) from John Wiley & Sons.

Sunday, 18 May 2014, 13:30–17:00 Studio 2

T4: Compressive Sensing for Wireless Communication

Byonghyo Shim, School of Information and Communication, Korea University, Korea

As a paradigm to reconstruct the sparse signals from the compressed measurements, compressive sensing (CS) has received great deal of interest in recent years. While this paradigm is well-known to the image/signal processing field, dissemination of this new topic to wireless communications is rather slow. In this tutorial, we will provide in-depth discussion on the basics of CS principle and how this paradigm can be integrated into wireless communication applications.

Byonghyo Shim received the B.S. and M.S. degrees from Seoul National University, Korea, in 1995 and 1997, respectively, and the M.S. and Ph.D. degrees from the University of Illinois at Urbana-Champaign (UIUC), Urbana, in 2004 and 2005, respectively. From 1997 and 2000, he was with the Department of Electronics Engineering at the Korean Air Force Academy as an Academic Full-time instructor. He also had a short time research position in the DSP group of LG Electronics and DSP R&D Center, Texas Instruments Incorporated, Dallas, TX, in 1997 and 2004, respectively. From 2005 to 2007, he was with

the Qualcomm Inc., San Diego, CA. Since September 2007, he has been with the School of Information and Communication, Korea University, Seoul, Korea, where he is an Associate Professor. His research interests include wireless communications, statistical signal processing, estimation and detection, applied linear algebra, and information theory. Dr. Shim was the recipient of the 2005 M. E. Van Valkenburg Research Award from the ECE Department of the University of Illinois and 2010 Hadong Young Engineer Award from IEEK. He is a senior member of IEEE, an associate editor of IEEE Wireless Communications Letters.

Sunday, 18 May 2014, 8:30–12:00 Studio 2

T7: Cooperative Near-Capacity Wireless System Design

Lajos Hanzo, School of Electronics and Computer Science, University of Southampton, UK

This overview introduces the principles of cooperative communication, commencing with the introduction of the basic MIMO types having both co-located and distributed antenna elements and continues with a portrayal of cognitive radio aided cooperation, win-win cooperation, a glimpse of base-station cooperation, and so on.

Lajos Hanzo (http://www-mobile.ecs.soton.ac.uk) FREng, Royal Society Wolfson Fellow, FIEEE, FIET, Fellow of EURASIP, European Research Council Advanced Fellow, DSc has held various research and academic posts in Hungary, Germany and the UK. He has co-authored 20 Wiley-IEEE Press books and has 1400+ research contributions at IEEE Xplore as well as 18 000 citations

Sunday, 18 May 2014, 8:30–12:00 Studio 3

T9: Beamforming in Multi-Cell Systems

Jinho Choi, School of Information and Communications, Gwangju Inst. of Science & Tech. (GIST), Korea

Beamforming has been studied to increase signal-to-noise ratio (SNR) or spatial multiplexing gain in wireless communication systems over the last two decades. In particular, multiple-input multiple-output (MIMO) systems, beamforming plays a crucial role in exploiting the tradeoff between multiplexing and diversity gains. In future wireless systems, the role of beamforming will be more important as large antenna arrays are to be employed at base stations. In this tutorial, we overview existing beamforming methods used for single-user and multi-user systems. Then, we present some recent advances of beamforming for more general systems such as multi-cell MIMO systems. Network and massive MIMO will also be presented. Some discussions will be made on how beamforming techniques can be evolved in future systems, e.g., 5G.

Jinho Choi (Senior Member of IEEE) was born in Seoul, Korea. He received B.E. (magna cum laude) degree in electronics engineering in 1989 from Sogang University, Seoul, and the M.S.E. and Ph.D. degrees in electrical engineering from Korea Advanced Institute of Science and Technology (KAIST), Daejeon, in 1991 and 1994, respectively. He is now with School of Information and Communications, Gwangju Institute of Science and Technology (GIST), Korea, as a professor. Prior to joining GIST, he was with the College of Engineering, Swansea University, United Kingdom, as a Professor/Chair in Wireless Communications. His research interests include wireless communications and array/statistical signal processing. He authored two books published by Cambridge University Press in 2006 and 2010. Prof. Choi received the 1999 Best Paper Award for Signal Processing from EURASIP, 2009 Best Paper Award from WPMC (Conference), and is Senior Member of IEEE. Currently, he is an Associate Editor of IEEE Communications Letters and an Editor of Journal of Communications and Networks (JCN) since 2005 and served as an Associate Editor of IEEE Transactions on Vehicular Technology from 2005 to 2007 and ETRI journal.

Sunday, 18 May 2014, 13:30–17:00 Studio 3

T10: Toward Information-Centric Vehicular Networking

Sangheon Pack, Korea University, Korea ; Jong-Hyouk Lee, Sangmyung University, Korea

For emerging services (e.g., road safety, traffic efficiency, and infotainment) in future vehicular networks, a paradigm shift from address centric networking to information/contents centric networking is indispensible since information/contents centric networking enables timely and reliable information/contents dissemination with easy adoption of new services. This tutorial is intended to 1) present current architectures, services, and standardization activities of address centric vehicular networking; and 2) give an introduction of information/contents centric vehicular networking architectures and emerging services. Also, key enabling technologies for future vehicular networking are identified and detailed.

Sangheon Pack received the B.S. and Ph.D. degrees from Seoul National University, Seoul, Korea, in 2000 and 2005, respectively, both in computer engineering. In 2007, he joined the faculty of Korea University, Seoul, Korea, where he is currently an Associate Professor in the School of Electrical Engineering. From 2005 to 2006, he was a Postdoctoral Fellow with the Broadband Communications Research Group, University of Waterloo, Waterloo, ON, Canada. He was the recipient of KICS (Korean Institute of Communications and Information Sciences) Haedong Young Scholar Award 2013 and IEEE ComSoc APB Outstanding Young Researcher Award in 2009. He was a publication co-chair of IEEE INFOCOM 2014, a co-chair of IEEE VTC 2010-Fall transportation track, a co-chair of IEEE WCSP 2013 wireless networking symposium, a TPC vice-chair of ICOIN 2013, and a publicity co-chair of IEEE SECON 2012. He is an editor of Journal of Communications Networks (JCN) and a senior member of the IEEE. His research interests include Future Internet, SDN/ICN/DTN, mobility management, mobile cloud networking, multimedia networking, and vehicular networks.

Jong-Hyouk Lee received the M.S. and Ph.D. degrees in Computer Engineering from Sungkyunkwan University, Korea. Dr. Lee was a researcher at INRIA, France and was an Assistant Professor at TELECOM Bretagne, France. He is now an Assistant Professor at the Department of Computer Software Engineering, Sangmyung University, Korea. Dr. Lee won the Best Paper Award at the IEEE WiMob 2012 and was a tutorial speaker at the IEEE WCNC 2013. He is an associate editor of Wiley Security and Communication Networks and IEEE Transactions on Consumer Electronics. Research interests include authentication, privacy, and Internet mobility management.

Sunday, 18 May 2014, 8:30–12:00 Studio 4

T11: M2M Communications Within Future Communication Networks

Konstantinos Dimou, Intel

Around 2020 some billions of devices are going to be connected. Everything benefiting from being connected will be connected. New and diverse Machine To Machine (M2M) applications are expected: from wearables, low cost monitoring sensors for agriculture purposes, health applications and to vehicle to vehicle communications as well as for smart grid and for high end computing machines and robots exchange very high data rates with latency requirements in the order of a

millisecond. These new applications and their traffic exhibit new requirements in terms of data rates, delay, energy consumption which are different from the requirements imposed by human centric communications. Moreover, it is anticipated that devices of various capabilities are going to co-exist within the same radio access networks. In addition, this unprecedented high amount of connected devices sets a stringent requirement for reduced signaling overhead. A key question to be answered by system designers and researchers is how to evolve current wireless networks so as to accommodate devices of various capabilities and with many different traffic characteristics. This tutorial aims at providing the basis for how data rate, energy consumption, device cost, latency and signaling overhead requirements are driving the design of radio interface, e.g. radio signal, time frame structure, as well as multiple-access mode. Suitability of current 4G wireless systems for meeting these goals is discussed. Evolution directions towards 5G wireless networks are proposed.

Konstantinos Dimou is research scientist at Intel Labs. He has held several positions in industry. In 2011-2012 he was visiting researcher at Wireless Systems Laboratory at Stanford University.

The following tutorials originally planned have been cancelled:

T3: Wireless Network Economics and Games

Jianwei Huang, The Chinese University of Hong Kong, China

T5: Mobile Service Evolution beyond LTE-Advanced

Ki-Dong Lee, LG Electronics Mobile Research, USA

T6: Wireless Access Infrastructure Economics

Jens Zander and Jan Markendahl, Royal Institute of Technology (KTH), Sweden

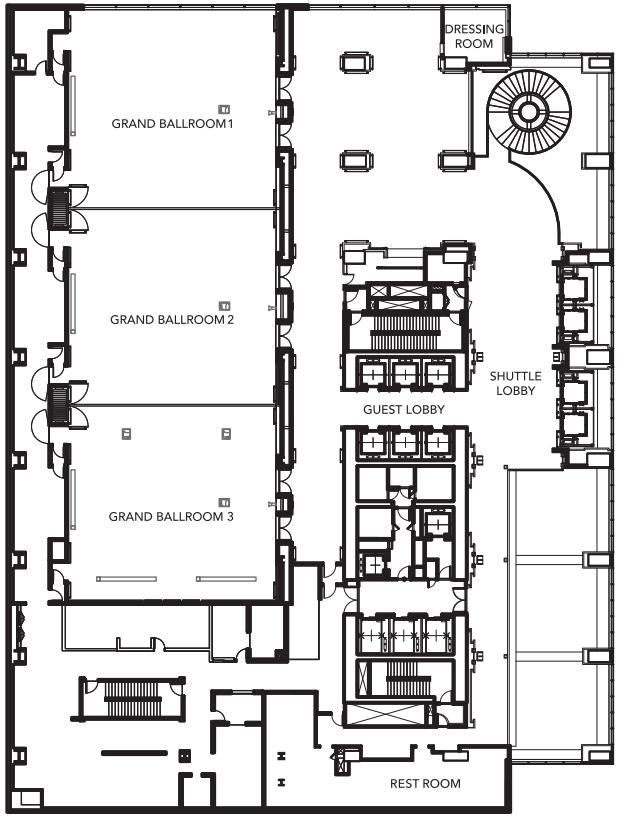
T8: Collaborative Networked Organization

Morcous M. Yassa, Cairo University, Egypt

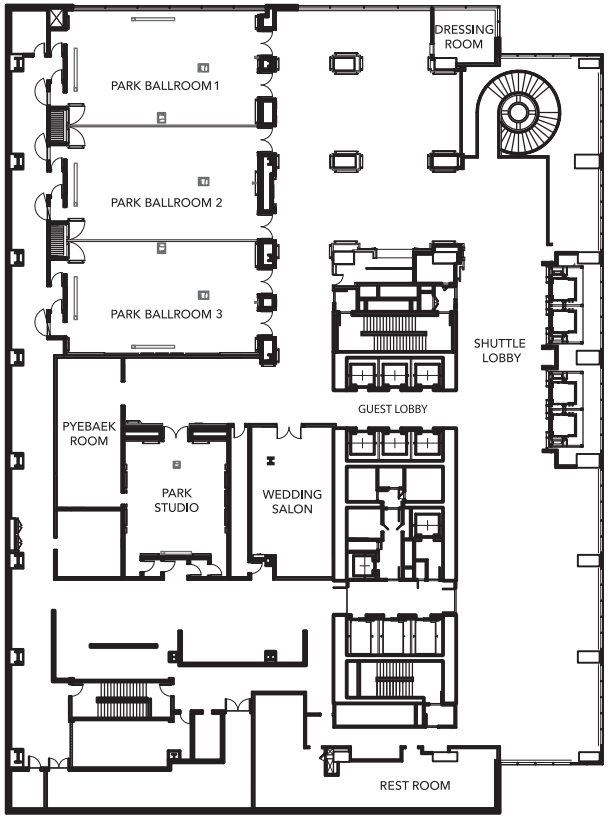
		Studio 1	Studio 2	Studio 3	Studio 4	Park Ballroom 1	Park Ballroom 2	Park Ballroom 3
SUNDAY 18 May								
7:00-17:30		Registration (Grand Ballroom Foyer)						
8:30-10:00		T1 Heterogeneous Cellular Networks	T7 Cooperative Near-Capacity Wireless System Design	T9 Beamforming in Multi-Cell Systems	T11 M2M Comms Within Future Communication Networks	Workshop: 2014 IEEE VTC-WoW	Workshop: VTM 2014	Workshop: MWC2020 '14
10:00-10:30		Coffee and Refreshments (Studio 123 Foyer)						
10:30-12:00		T1 Heterogeneous Cellular Networks	T7 Cooperative Near-Capacity Wireless System Design	T9 Beamforming in Multi-Cell Systems	T11 M2M Comms Within Future Communication Networks	2014 IEEE VTC-WoW	VTM 2014	MWC2020 '14
12:00-13:30		Lunch Break (on your own)						
13:30-15:00		T2 4G & Beyond: LTE and LTE-Advanced	T4 Compressive Sensing for Wireless Communication	T10 Toward Information-Centric Vehicular Networking		2014 IEEE VTC-WoW	VTM 2014	MWC2020 '14
15:00-15:30		Coffee and Refreshments (Studio 123 Foyer)						
15:30-17:00		T2 4G & Beyond: LTE and LTE-Advanced	T4 Compressive Sensing for Wireless Communication	T10 Toward Information-Centric Vehicular Networking		2014 IEEE VTC-WoW	VTM 2014	MWC2020 '14
18:00-20:00		VTC Welcome Reception (Grand Ballroom)						

		Studio 1 (A)	Studio 2 (B)	Studio 3 (C)	Studio 4 (D)	Studio 5 (E)	Studio 8 (F)	Studio 9 (G)	Studio 10 (H)
SUNDAY 18 May									
7:00-17:30		Registration (Grand Ballroom Foyer)							
8:30-17:00		Tutorials, Workshops and other events: See separate program							
18:00-20:00		VTC Welcome Reception (Grand Ballroom)							
MONDAY 19 May									
7:00-17:00		Registration (Grand Ballroom Foyer)							
8:30-9:00		Opening Plenary: Youngnam Han, VTC2014-Spring General Chair; Fabrice LaBeau, VTS President; Seong-Cheol Kim and Saewoong Bahk, VTC2014-Spring Tech Prog Chairs (Grand Ballroom)							
9:00-10:00		Keynote Plenary: Global ICT Outlook, Dr. Jae W. Byun, CTO, SK Telecom (Grand Ballroom)							
10:00-10:30		Coffee and Exhibits (Grand Ballroom Foyer)							
10:30-12:00	(1)	Localization 1	Green Networks	Association Control	Spectrum Sensing	Wireless System Design	Wireless Sensor Networks 1	Cooperative Networks 1	Precoding and Decoding
12:00-13:30		Lunch (Grand Ballroom)							
13:30-15:00	(2)	Localization 2	Energy Efficiency 1	LTE Performance Analysis	Cognitive Radio 1	Channel Estimation 1	Wireless Sensor Networks 2	Cooperative Networks 2	Massive MIMO
15:00-15:30		Coffee and Exhibits (Grand Ballroom Foyer)							
15:30-17:00	(3)	Positioning and Tracking	Energy Efficiency 2	Transmission Schemes	Cognitive Radio 2	Channel Characterization	Ad-hoc and Mesh Networks	Interference Mitigation	Modulation
18:00-20:00		Panel Discussion on 5G (Grand Ballroom)							
TUESDAY 20 May									
8:00-17:30		Registration (Grand Ballroom Foyer)							
9:00-10:00		Keynote Plenary: 5G Vision & Key Enabling Technologies, Dr. Kyungwhoon Cheun, SVP Samsung Electronics (Grand Ballroom)							
10:00-10:30		Coffee and Exhibits (Grand Ballroom Foyer)							
10:30-12:00	(4)		Resource Allocation 1	Interference Management 1	Spectrum Sharing	Transmission Techniques 1	Relaying and Routing	Beamforming	MIMO System 1
12:00-13:30		Awards Lunch (Grand Ballroom)							
13:30-15:00	(5)		Network Performance Analysis 1	Power Control	D2D	Transmission Techniques 2	OFDM	Interference Management 2	Multiuser-MIMO
15:00-15:30		Coffee and Exhibits (Grand Ballroom Foyer)							
15:30-17:00	(6)		Network Performance Analysis 2	Load Balancing and Scheduling	Non-orthogonal Multiple Access	Transmission Techniques 3	Cellular Networks	Resource Allocation 2	Interference Management 3
19:00-22:00		VTC2014-Spring Banquet (Grand Ballroom)							
WEDNESDAY 21 May									
7:30-15:30		Registration (Grand Ballroom Foyer)							
8:30-10:00	(7)	Antenna	Network Coding	Heterogeneous Network 1	Resource Allocation 3	Coding 1	Vehicular Communications	Relay Selection	Interference Management 4
10:00-10:30		Coffee and Exhibits (Grand Ballroom Foyer)							
13:30-15:00	(8)	RF Design	Wireless Networks	Heterogeneous Network 2	Coding 2	Channel Estimation 2	Transportation Communications 1	Relaying	Body-Area Networks
12:00-13:30		Lunch (Grand Ballroom)							
13:30-15:00	(9)	Propagation Modeling	Interference Management and Synchronization	Wireless LAN	Transportation Communications 2	MIMO Systems 2	Vehicular Networks	MIMO Systems 3	National Instruments Industry Session
15:00-15:30		Coffee and Exhibits (Grand Ballroom Foyer)							
15:30-17:00	(10)	Channel Modeling	Network Security	Wireless Access in LTE-A and 5G	Applications and Services	Interference Management 5	Vehicular Technologies	Two-Way Relaying	Workshop: VLCVN 2014

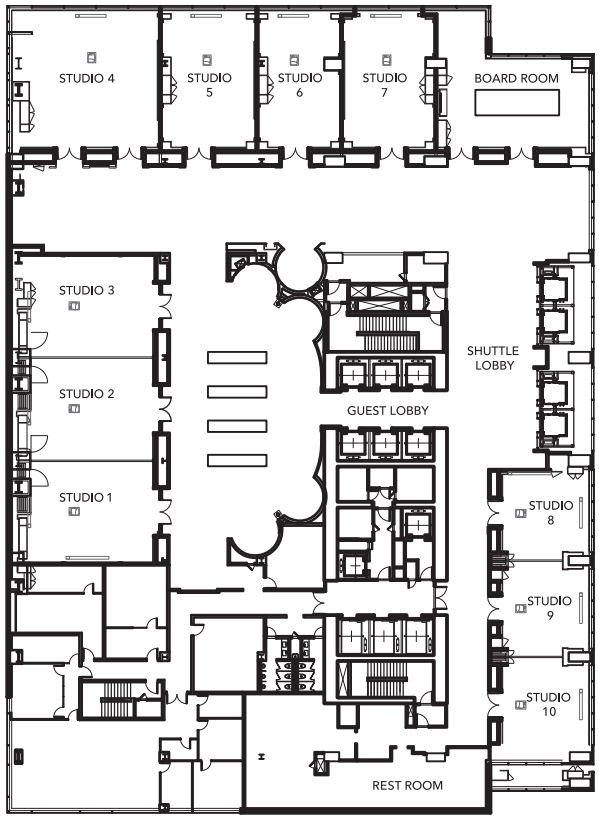
LEVEL 3



LEVEL 5



LEVEL 6



VTC2014-Spring Technical Programme

Monday 19 May 2014

Monday 19 May 10:30-12:00 Studio 1

1A: Localization 1

Chair: Lee Taikjin, KIST, Korea

1 Accurate Localization of Passive Sensors Using Multiple Impedance Measurements
Eric Slottke, Armin Wittneben, Swiss Federal Institute of Technology (ETH) Zurich

2 Distributed Localization for Wireless Sensor Networks using Binary Particle Swarm Optimization (BPSO)
Ifa Fatihah, Soo Young Shin, Kumoh National Institute of Technology

3 Distribution Localization Estimation Algorithm in Wireless Sensor Networking
Junhui Zhao, Hao Zhang, Beijing Jiaotong University; Rong Ran, Soongsil University

4 Applicablility of Null-Steering for Spoofing Mitigation in Civilian GPS
Jaroslaw Magiera, Ryszard J. Katulski, Technical University of Gdansk

5 Distributed Cooperative Localization with EW-TLS Model in Wireless Networks
Yulong Shi, Cui Qimei, Xuefei Zhang, Beijing University of Posts and Telecommunications

Monday 19 May 10:30-12:00 Studio 2

1B: Green Networks

Chair: Christian Wietfeld, TU Dortmund University, Germany

1 NCMOB-MAC: A Network Coding-based MAC protocol with mobility support
Pol Torres Compta, acticom GmbH; Angelos Antonopoulos, CTTC; Gerrit Schulte, acticom GmbH; Luis Alonso, UPC; Christos Verikoukis, CTTC

2 Cross Entropy Optimization for Constrained Green Cooperative Cognitive Radio Network
Muhammad Naeem, Ahmed Khwaja, Alagan Anpalagan, Muhammad Jaseemuddin, Ryerson University

3 Dynamic green communication strategy for railway cellular network
Huang Jiying, Zhong Zhangdui, Beijing Jiaotong University

4 An Adaptive Energy-aware Virtual Network Embedding Scheme
Hui Liu, Cui Hongyan, Jia Wang, Bo Lu, Jianya Chen, Beijing University of Posts and Telecommunications

5 User Traffic Prediction Based on K Neighbors Collaborative Filtering for CASoRT System
Minglu Liu, Zhong Xiaofeng, Xiaolong Fu, Jing Wang, Tsinghua University

Monday 19 May 10:30-12:00 Studio 3

1C: Association Control

Chair: Dharmendra Dixit, The LNM-Institute of Information Technology, India

1 Dynamic Nomadic Node Selection for Performance Enhancement in Composite Fading/Shadowing Environments
Ömer Bulakci, Huawei European Research Center; Zhe Ren, BMW; Chan Zhou, Josef Eichinger, Huawei European Research Center; Peter Fertl, BMW; Slawomir Stanczak, Fraunhofer German-Sino Lab for Mobile Communications

2 A Distributed Prioritization Scheme Between Access Points for Densely Deployed Networks
Sung-Guk Yoon, Saewoong Bahk, Seoul National University

3 Mode Selection for Mobile Opportunistic Multi-hop Cellullar Networks
Mª Carmen Lucas Estañ, University Miguel Hernandez; Javier Gozálvez, University Miguel Hernández; Baldomero Coll-Perales, Miguel Hernandez University of Elche

4 I-DCF: Improved DCF for channel access in IEEE 802.11 wireless networks
Indira Paudel, Institut Mines Telecom; Badii Jouaber, Institut Mines Telecom, TELECOM SudParis

5 Channel Allocation Algorithm Alleviating the Hidden Channel Problem in 802.11ac Networks
Seowoo Jang, Saewoong Bahk, Seoul National University

Monday 19 May 10:30-12:00 Studio 4

1D: Spectrum Sensing

Chair: Shusuke Narieda, Akashi National College of Technology, Japan

1 Robust Algorithm Against Spectrum Sensing Data Falsification Attack in Cognitive Radio Networks
Saud Althunibat, University of Trento; Marco Di Renzo, CNRS-SUPELEC-Univ Paris-Sud; Fabrizio Granelli, University of Trento

2 Block Outlier Methods for Malicious User Detection in Cooperative Spectrum Sensing
Sanket Kalamkar, Praveen Kumar Singh, Adrish Banerjee, Indian Institute of Technology, Kanpur

3 Adaptive Grouping Scheme for Cooperative Spectrum Sensing in Cognitive Radio Networks
Lamiaa Khalid, Alagan Anpalagan, Ryerson University

4 Sparse Spectrum Recovery of Streaming Signals Based on Multi-Resolution
Hang Li, Xin Wang, Beijing University of Posts & Telecommunications; Xing Wang, Simon Fraser University; Wenbin Guo, Beijing University of Posts & Telecommunications

5 Region Division based Spectrum Access of D2D Communication under Heterogeneous Networks
Yang Yang, Tao Peng, Peng Bo, Wenbo Wang, Beijing University of Posts & Telecommunications

Monday 19 May 10:30-12:00 Studio 5

1E: Wireless System Design

Chair: Inkyu Lee, Korea University, Korea

1 Improved Receivers for Asymmetrically-Clipped Optical OFDM
Zhe Chen, Dobroslav Tsonev, Harald Haas, University of Edinburgh

2 Abstract Radio Resource Management Framework for System Level Simulations in LTE-A Systems
Panagiotis Fotiadis, Aalborg University; Ingo Viering, Nomor Research GmbH; Paolo Zanier, Nokia Solutions and Networks; Klaus I. Pedersen, Nokia Siemens Networks

3 Uplink Design of Milimeter-Wave Mobile Communication System for High-Speed Trains
Seung Nam Choi, ETRI

4 A Novel Orthogonal Experimental Design Based QR Subspace MIMO Detection
Jiang Han, Cui Qimei, Chengcheng Yang, Beijing University of Posts and Telecommunications

5 Signaling-Embedded Preamble Design for Flexible Optical Transport Networks
Linglong Dai, Zhaocheng Wang, Tsinghua University

Monday 19 May 10:30-12:00 Studio 8

1F: Wireless Sensor Networks 1

Chair: Hyang-won Lee, Konkuk University, Korea

1 Study of Blind Rendez-vous in Low Power Wireless Sensor Networks
Affoua Thérèse Aby, LIMOS; Alexandre Guitton, Clermont Université, Université Blaise Pascal / LIMOS; Michel Misson, Université Blaise PASCAL

2 Performance Analysis of Periodic Busy Tones Protecting a ZigBee Network from Wi-Fi Interruption
Jinwoo Ock, Seoul National University; Young-June Choi, Ajou University; Saewoong Bahk, Seoul National University

3 On Power Consumption of Wireless Sensor Nodes with Min(N,T) Policy in Spectrum Sharing Systems
Charles Kabiri, Hans-Jürgen Zepernick, Blekinge Institute of Technology; Hung Tran, National Institute of Education Management

4 Green Traffic Compression in Wireless Sensor Networks
Kang-Hao, Peng, K-C Chen, National Taiwan University; Shao-Lun Huang, Massachusetts Institute of Technology; Shao-Chou Hung, National Taiwan University; Xin-Hao Cheng, IBM Research China

5 Wastage-Aware Route Selection Scheme in Energy-Harvesting Wireless Sensor Networks
Gina Martinez, Illinois Institute of Technology; Shufang Li, Beijing University of Posts and Telecommunications; Chi Zhou, Illinois Institute of Technology

Monday 19 May 10:30-12:00 Studio 9

1G: Cooperative Networks 1

Chair: Kwang Soon Kim, Yonsei University, Korea

1 Reducing Video Interruption Probability With Cooperative Heterogeneous Networks
Antti Anttonen, Aarne Mämmelä, VTT Technical Research Centre of Finland

2 Fair and Energy-aware Power Allocation Scheme in Multi-cell MIMO Cooperative Networks
Imen Ben Chaabane, Supcom; Soumaya Hamouda, Sup'Com; Sami Tabbane, Sup'Com Tunis

3 Centralized and Decentralized Coordinated Scheduling with Muting
Rajeev Agrawal, Nokia Siemens Networks; Anand Bedekar, Nokia Solutions and Networks; Suresh Kalyanasundaram, Naveen Arulselvan, Troels E. Kolding, Hans Kroener, Nokia Siemens Networks

4 Bottleneck Effects Elimination for Cooperative Cognitive Radio Networks: A New Dimension of Time Slot Rearrangement
Wenson Chang, Chien-Heng Wang, National Cheng Kung University

5 A Low Complexity Configuration Selection Algorithm in IA-aided Uplink Coordinated Multipoint Systems
Ming-Chun Lee, Chester Huang, Wei-Ho Chung, Academia Sinica; Ta-Sung Lee, National Chiao Tung University

Monday 19 May 10:30-12:00 Studio 10

1H: Precoding & Decoding

Chair: Seung Jun Baek, Korea University, Korea

1 MRC-Based Relay Precoding for Cooperative AF Multi-Antenna Relay Networks with CSI
Tuyen Tran, Nghi Tran, University of Akron; Trung Q. Duong, Queen's University Belfast; Maged Elkashlan, Queen Mary, University of London; Hamid Reza Bahrami, The University of Akron

2 A Simple Decision-Feedback Block Differential Detection Scheme for DSTBC
Hiroshi Kubo, Ritsumeikan University

3 Low Information-Exchange and Robust Distributed MMSE Precoding Algorithm for C-RAN
Na Li, Zesong Fei, Chengwen Xing, Beijing Institute of Technology; Liang Sun, NEC Labs China; Ming Lei, NEC laboratories, China

4 Robust Decoding Against Unknown Interference for BICM-OFDM Systems
Der-Feng Tseng, National Taiwan University of Science and Technology

5 On the Estimation of Slow-Fading Coefficients for Pilot Contamination Precoding
Jinho Choi, Gwangju Institute of Science and Technology; Jeongseok Ha, Korea Advanced Institute of Science and Technology

Monday 19 May 13:30-15:00 Studio 1

2A: Localization 2

Chair: Yongwan Park, Yeungnam University, Korea

1 Frame Theory and Optimal Anchor Geometries in Wireless Localization
Samuel Van de Velde, University of Ghent; Giuseppe Abreu, Jacobs University; Heidi Steendam, Ghent University

2 MDS-LM for Wireless Sensor Networks Localization
Nasir Saeed, Haewoon Nam, Hanyang University

3 Phone-Radar: Infrastructure-free Device-to-device Localization
Zheng Song, Beijing University of Post and Telecommunication; Jian Ma, Wuxi Smart Sensing Star Co.Ltd; Mingming Dong, Wendong Wang, Beijing University of Post and Telecommunication

4 Small scale tracking scheme for low mobility devices in machine type communications
Cheng-Yuan Hsiao, Sok-Ian (Ines) Sou, Chuan-Sheng Lin, National Cheng Kung University

5 Maximum Likelihood Localization Using A Priori Position Information of Inaccurate Anchors
Bin Li, Nan Wu, Hua Wang, Jingming Kuang, Beijing Institute of Technology

Monday 19 May 13:30-15:00 Studio 2

2B: Energy Efficiency 1

Chair: Cheolgi Kim, Korea Aerospace University, Korea

1 Passive detection of wrong way drivers on motorways based on low power wireless communications
Stephan Haendeler, Andreas Lewandowski, Christian Wietfeld, TU Dortmund University

2 Joint Uplink and Downlink User Association for Energy-Efficient HetNets Using Nash Bargaining Solution
Dantong Liu, Yue Chen, KoK Keong Chai, Queen Mary University of London; Tiankui Zhang, Beijing University of Posts and Telecommunications

3 Energy Efficiency of Relay Operation in Millimeter-Wave Mobile Broadband Systems
Seonghwa Yun, Seung Hyun Jeon, Jun Kyun Choi, KAIST

4 Cross-layer Cooperative Delay-energy Tradeoff Scheme for Hybrid Services in Cellular Networks
Siqi Cao, Cui Qimei, Yulong Shi, Hui Wang, Beijing University of Posts and Telecommunication

5 Energy Efficiency Analysis of Soft and Hard Cooperative Spectrum Sensing Schemes in Cognitive Radio Networks
Saud Althunibat, Fabrizio Granelli, University of Trento

Monday 19 May 13:30-15:00 Studio 3

2C: LTE Performance Analysis

Chair: Xu Shaoyi, Beijing Jiaotong University, China

1 Link Level Performance Assessment of Reliability-Based HARQ Schemes in LTE
Matthias Woltering, Dirk Wübben, Armin Dekorsy, University of Bremen; Volker Braun, Uwe Doetsch, Bell Labs, Alcatel-Lucent

2 Impact of CSI Optimization and CRS Selection on Performance of LTE Release 8 Networks
Govardhan Madhugiri, Lund University; Chrysostomos Koutsimanis, Per Skillermark, Ericsson Research

3 Performance Analysis and UE-side Improvement of Extended Access Barring for Machine Type Communications in LTE
Zhang Zhang, Alcatel-Lucent Shanghai Bell; Hua CHAO, Alcatel-Lucent Shanghai Bell Co. Ltd; Wei Wang, Xun Li, Alcatel-Lucent Shanghai Bell

4 On the Performance Comparison between IEEE 802.11p and LTE-based Vehicular Networks
Zeeshan Hameed Mir, Qatar Mobility Innovations Center (QMIC); Fethi Filali, QMIC

5 Global Ergodic Capacity Closed-Form Expression of Coexisting DVB-LTE-Like Systems
Hiba Bawab, Lebanese University(Lebanon), INSA of Rennes(France); Philippe MARY, IETR/INSA de Rennes; Jean-Francois Helard, INSA Rennes; Youssef Nasser, American University of Beirut; Oussama Bazzi, Lebanese University

Monday 19 May 13:30-15:00 Studio 4

2D: Cognitive Radio 1

Chair: Adrish Banerjee, Indian Institute of Technology Kanpur, India

1 Decode and Zero-forcing Forward Relaying with Relay Selection in Cognitive Radio Systems
Ki-Hong Park, Mohamed-Slim Alouini, KAUST

2 Correlation based Soft Combining Scheme for Cooperative Spectrum Sensing in Cognitive Radio Networks
Dost Muhammad Saqib Bhatti, Haewoon Nam, Hanyang University

3 Outage Analysis of Cognitive Incremental DF Relay Network in Nakagami-m Fading Channels
Yuan Chang, Yonghua Li, Zhongwei Si, Yueming Lu, Jiaru Lin, Beijing University of Posts and Telecommunications

4 Study on Protocol Design and Performance Analysis for Cognitive Relay Networks
Lei Chen, China Criminal Police College; X. Wang, Beijing University of Posts and Telecommunications

5 On the Achievable Rate of MIMO Cognitive Radio Network with Multiple Secondary Users
Wenbo Xu, Xiaonan Zhang, Jing Zhai, Jiaru Lin, Beijing University of Posts and Telecommunications

Monday 19 May 13:30-15:00 Studio 5

2E: Channel Estimation 1

Chair: Seongill Park, Qualcomm, Korea

1 Optimized Channel Estimation for OFDMA Uplink with Frequency-Dependent I/Q Imbalance
Pranav Sakulkar, Aamir Ishaque, Gerd Ascheid, RWTH Aachen University

2 Proposal of Channel Estimation Method for Bi-directional OFDM Based ANC in Higher Time-varying Fading Channel
Tanairat MATA, Katsuhiro Naito, Mie University; Pisit Boonsrimuang, King Mongkut`s Institute of Technology Ladkrabang; Kazuo Mori, Hideo KOBAYASHI, Mie University

3 Joint Channel Estimation Methods in Carrier Aggregation OFDM Systems
Borching Su, Min-Yu Wang, National Taiwan University

4 Evaluation of Cramer-Rao Bounds for Phase Estimation of Coded Linearly Modulated Signals
Nan Wu, Hua Wang, Hongjie Zhao, Jingming Kuang, Beijing Institute of Technology

5 Recursive Phase Estimation for Asymmetric M-PSK TCM Schemes in Fading Channels
Emna Ben Slimane, National School of Engineers of Tunis; Slaheddine Jarboui, Laboratory of Communication Systems

Monday 19 May 13:30-15:00 Studio 8

2F: Wireless Sensor Networks 2

Chair: Jae-hyun Kim, Ajou University, Korea

1 Neighbor Cardinality Estimation with Low-Power Transceivers: Implementation and Experimental Results
Micha Rappaport, Evsen Yanmaz, Christian Bettstetter, University of Klagenfurt

2 Exploiting Temporal Correlation of Sparse Signals in Wireless Sensor Networks
Ahmed S. Alwakeel, Department of Communication and Electronics, Sinai University, Egypt; Mohamed F. Abdelkader, Port Said University; Karim G. Seddik, American University in Cairo, Egypt; Atif Ghoneim, Port Said University, Egypt

3 Interference Resolution Method for IEEE802.15.4-based Wireless Sensor Networks
Ji-Hoon Park, Nongshim Data System; Chan-Min Park, SeungjinLee, Byung-Seo Kim, Hongik University

4 Prolonging WSN Lifetime with Data-Location Similarity and Weakest Node Protection
Jenq-Shiou Leu, National Taiwan University of Science and Technology; Cheng-Tsung Chen, ASUS; Tung-Hung Chiang, National Taiwan University of Science and Technology

5 Spectrum sharing game with flexible channelization for non-cooperative wireless networks
Deming Pang, Gang Hu, Xu Ming, National University of Defense Technology

Monday 19 May 13:30-15:00 Studio 9

2G: Cooperative Networks 2

Chair: Wan Choi, KAIST, Korea

1 Robust FFT Window Replacement in non-ideal CoMP Networks with Timing Offset
Stanislaus Iwelski, Zijian Bai, Erfan Majeed, Guido Bruck, Peter Jung, University Duisburg-Essen; Biljana Badic, Tobias Scholand, Rajarajan Balraj, Intel Mobile Communications; Chun-Hsuan Kuo, Intel Corporation

2 Use of Coordinated Multipoint Transmission for Relaxation of Relay Link Bottlenecks
Beneyam Berehanu Haile, Edward Mutafungwa, Jyri Hämäläinen, Aalto University

3 Experimental Performance Evaluation of Role-Based Connectivity Management for Cooperating UAVs
Niklas Goddemeier, Sebastian Rohde, Christian Wietfeld, TU Dortmund University

4 Space Time Coded Signal Space Diversity For Multi-Hop Cooperative Wireless Communication
Sarmad Sohaib, Saima Zaheer, University of Engineering and Technology, Taxila

5 Secure Cooperative Communication with Nth Best Relay Selection
Xinjie Wang, Hao Zhang, Ocean University of China; Trung Q. Duong, Queen's University Belfast; Maged Elkashlan, Queen Mary, University of London; Vo Nguyen Quoc Bao, Posts and Telecommunications Institute of Technology

Monday 19 May 13:30-15:00 Studio 10

2H: Massive MIMO

Chair: Gregory Morozov, Intel, Russia

1 Antenna Grouping based Beaforming for Large-scale MIMO Systems
Byungju Lee, Byonghyo Shim, Korea University

2 Detection in Large-Scale Multiuser SM-MIMO Systems: Algorithms and Performance
Patchava Raviteja, T Lakshmi Narasimhan, A. Chockalingam, Indian Institute of Science, Bangalore

3 On the Uplink Capacity of High Speed Railway Communications with Massive MIMO Systems
Ziyue Liu, University of Southwest Jiaotong; Jingxian Wu, University of Arkansas, USA; Pingzhi Fan, University of Southwest Jiaotong

4 Detection and Decoding in Large-Scale MIMO Systems: A Non-Binary Belief Propagation Approach
T Lakshmi Narasimhan, A. Chockalingam, Indian Institute of Science, Bangalore

5 A Temporal Domain Based Method against Pilot Contamination for Multi-cell Massive MIMO Systems
Hualei Wang, Zhengang Pan, Jiqing Ni, Sen Wang, Chih-Lin I, The Research Institution of China Mobile

Monday 19 May 15:30-17:00 Studio 1

3A: Positioning & Tracking

Chair: Xiaofeng Zhong, Tsinghua University, China

1 Analysis of Accuracy of Modified Gradient Method in Indoor Radionavigation System
Agnieszka Czapiewska, Jaroslaw Sadowski, Gdansk University of Technology

2 Hazard Detection System by Using the Kinect Sensor for Game in a Handle Type Electric Wheelchair
Jeyeon KIM, Tsuruoka National College of Technology; Takaaki HASEGAWA, Saitama university

3 Recursive Bayesian Estimation using A Topological Map for Indoor Position Tracking
Yuan Yang, Yubin Zhao, Freie Universitaet Berlin; Marcel Kyas, Freie Universität Berlin

4 Precise Location by Fingerprinting Road Segments with Variation of Wireless Reception
Tsuneo Nakata, Shigeki Kawai, DENSO CORPORATION

5 TOA Estimation Using Checking Window for IR-UWB Energy Detection Receivers
Hong Cai, Tiejun Lv, Hui Gao, Anzhong Hu, Beijing University of Posts and Telecommunications

Monday 19 May 15:30-17:00 Studio 2

3B: Energy Efficiency 2

Chair: Young-Bae Ko, Ajou University, Korea

1 Ensuring Energy Efficient 5G User Equipment by Technology Evolution and Reuse
Mads Lauridsen, Gilberto Berardinelli, Troels B. Sørensen, Preben E. Mogensen, Aalborg University

2 Assessment of Alternatives for Reducing Energy Consumption in Multi-RAT Scenarios
Pål Frenger, Ericsson Research, Linköping, Sweden; Mårten Ericson, Ericsson Research

3 Realistic Energy Consumption Model for On-Off Keying Based Minimum Energy Coding
Peng Yue, Guillaume Andrieux, Jean-Francois Diouris, Polytechnique University of Nantes

4 Energy Efficient WiFi Offloading for Cellular Uplink Transmissions
Ubolthip Sethakaset, Yeow-Khiang Chia, Sumei Sun, Institute for Infocomm Research

5 Performance of Wireless Nano-Sensor Networks with Energy Harvesting
Chang Kyung Sung, Zhuo Chen, CSIRO; Malcolm Egan, University of Sydney; Iain B. Collings, CSIRO

Monday 19 May 15:30-17:00 Studio 3

3C: Transmission Schemes

Chair: Rui Fan, Ericsson China Communication Company, China

1 The Effect of Discontinuous Reception and RRC Release Timer Parameterization on Mobility
Jani Puttonen, Magister Solutions Ltd; Fedor Chernogorov, Magister Solutions Ltd.

2 Device-to-Device Communication in Wireless Mobile Social Networks
Jemin Lee, Tony Q.S. Quek, Singapore University of Technology and Design

3 Local Overload Compensation through LTE System Level Interference Control in Realistic Scenarios
Sebastian Rohde, Christoph Ide, Tim Kolanczyk, Christian Wietfeld, TU Dortmund University

4 Performance Analysis of Contention based Services with Bulk Transmission in IEEE 802.16 OFDMA Networks
Jianqing Liu, Sammy Chan, City University of Hong Kong; Xueyuan Su, Oracle Corporation; Hai Vu, Swinburne Univ. of Tech

5 An Enhanced Coarse Synchronization Scheme with Low Complexity for 3GPP LTE
Dingyu Zhang, Liying Chou, Feilong Peng, Cheng Wang, Chaowei Wang, Wang Weidong, Beijing University of Posts and Telecommunications

Monday 19 May 15:30-17:00 Studio 4

3D: Cognitive Radio 2

Chair: Jaehak Chung, Inha Univ, korea

1 Improved ACLR by Cancellation Carrier Insertion in GFDM Based Cognitive Radios
Rohit Datta, TU Dresden; Gerhard Fettweis, Technische Universität Dresden

2 MSE-based Transceiver Design for Decentralized Transmit Power Minimization of Multi-cell MIMO Cognitive Radio Systems
Eun-Yeong Park, Young-Jin Kim, Moon-Gun Song, Gi-Hong Im, POSTECH

3 Optimal Spectrum Sensing for Cognitive Radio with Imperfect Detector
Hiteshi Sharma, Aaqib Patel, Indian Institute of Technology, Bombay; S. N. Merchant, IIT-Bombay; U.B.Desai, IITH

4 Sparse Spectrum Sensing with Sub-block Partition for Cognitive Radio Systems
Meng-Lin Ku, Xun-Ru Yin, National Central University

5 Joint Optimization of Power and Filter-And-Forward Beamforming in Cognitive Networks with Frequency Selective Channels
Peng Zhang, Li Guo, Tianyu Kang, Jianwei Zhang, Beijing University of Posts and Telecommunications

Monday 19 May 15:30-17:00 Studio 5

3E: Channel Characterization

Chair: Haewoon Nam, Hanyang University, Korea

1 A Seletive Erasure Channel Model for Packet Collision Channels within Wireless Sensor Networks
Tallal El-Shabrawy, The German University of Cairo

2 Channel Correlation Maps for Rate-Adaptive MIMO-OFDMA Systems
Huijun Li, Huan Wang, Gerd Ascheid, RWTH Aachen University

3 Joint Transmitter/Receiver Channel Equalization for Frequency-Domain Punctured Turbo Codes
Kengo Nakamura, Tokyo University of Science; Kazuki Takeda, NTT DOCOMO, INC.; Kenichi Higuchi, Tokyo University of Science

4 Capacity Analysis of a Multiuser Mixed RF/FSO
Liang Yang, Guangdong University of Technology; Xiqi Gao, Southeast University; Mohamed-Slim Alouini, KAUST

5 Adaptive Predistortion techniques for non-linearly amplified FBMC-OQAM signals
Rafik Zayani, 6'Tel@Sup'Com; Yahia Medjahdi, CNAM; Hanen Bouhadda, Sup'Com; Hmaied SHAIEK, CNAM-Paris; Daniel

Roviras, CNAM; Ridha Bouallegue, Ecole Superieure des Communications (Sup'Com)

Monday 19 May 15:30-17:00 Studio 8

3F: Ad-hoc & Mesh Networks

Chair: Kyunghan Lee, UNIST, Korea

1 **Optimizing Topology Update Interval in Mobile Ad-hoc Networks**
Quang-My Tran, Arek Dadej, University of South Australia

2 **A Probabilistic Neighbor Discovery Algorithm in Wireless Ad hoc Networks**
Taewon Song, Korea University; Hyunhee Park, INRIA; Sangheon Pack, Korea University

3 **A Dynamic Blocking Notification (BN) Scheme with Strategic Nodes for Wireless Ad Hoc Networks**
Chong Wai Kheong, Universiti Teknologi Petronas; Micheal Drieberg, Universiti Teknologi PETRONAS; Varun Jeoti, Universiti Teknologi Petronas

4 **A Performance Evaluation of Multiple MDRUs Based Wireless Mesh Networks**
Panu Avakul, Hiroki NISHIYAMA, Nei KATO, Tohoku University; Toshikazu Sakano, Atsushi Takahara, NTT Network Innovation Laboratories

5 **Impact of Social Features on the Performance of Pocket Switched Network**
Yuan Liu, Fei Yang, Sihai Zhang, Wuyang Zhou, University of Science and Technology of China

Monday 19 May 15:30-17:00 Studio 9

3G: Interference Mitigation

Chair: Marios Kountouris, SUPELEC, France

1 **Performance Assessment of Multi User Multi Cell Interference Alignment with Limited Feedback**
Danish Aziz, Radoslav Atanasov, Alcatel-Lucent Bell Labs; Andreas Weber, Bell Labs, Alcatel-Lucent

2 **Downlink-to-Uplink Interference Cancellation in Cloud Radio Access Networks**
Weiting Lin, Chia-Han Lee, Academia Sinica; Hsuan-Jung Su, National Taiwan University

3 **Intercell Interference Coordination under Data Rate Requirement Constraint in LTE-Advanced Heterogeneous Networks**
Zhi LIU, NII, The Graduate University for Advanced Studies; Yusheng Ji, National Institute of Informatics

4 **Antenna Resources Assignment for Multi-Cell Multi-User Interfering Networks Based on Interference Alignment**
Jin Jin, Beijing University of Posts and Telecommunications; Xiangchuan Gao, Zhengzhou University

5 **An interference alignment scheme for symmetric multicell multiuser channels**
Khanh Pham, Kyungchun Lee, Seoul National University of Science and Technology

Monday 19 May 15:30-17:00 Studio 10

3H: Modulation

Chair: Yong Soo Cho, Chung-Ang University, Korea

1 **A new DSTM scheme based on Weyl group for MIMO systems with 2, 4 and 8 transmit antennas**
Hui JI, INSA-Rennes; Gheorghe Zaharia, IETR/INSA de Rennes; Jean-Francois Helard, INSA Rennes

2 **Spatial Modulation for High-Rate Transmission Systems**
Thu Phuong Nguyen, Le Quy Don Technical University; Minh Tuan Le, Hanoi Department of Science and Technology; Vu-Duc Ngo, Hanoi University of Science and Technology; Xuan Nam Tran, Le Quy Don Technical University; Hae-Wook Choi, Korea Advanced Institute of Science and Technology

3 **Signal-Spatial Constellation Optimization for Generalized Spatial Modulation**
Wen-Hsin Wang, Ronald Y. Chang, Academia Sinica

4 **Single- and Multiple-RF Aided Non-Coherent Generalized Spatial Modulation**
Naoki Ishikawa, Shinya Sugiura, Tokyo University of Agriculture and Technology

5 **Signal Dependent Antenna Mapping for Spatial Modulation**
Jinho Choi, Gwangju Institute of Science and Technology

Tuesday 20 May 2014

Tuesday 20 May 10:30-12:00 Studio 2

4B: Resource Allocation 1

Chair: Zeeshan Hameed Mir, Qatar Mobility Innovations Center, Qatar

1 **Optimal Energy Efficient Resource Allocation for Heterogeneous Multi-homing Networks**
Quang-Doanh Vu, Kyung Hee University; Le-Nam Tran, Markku Juntti, University of Oulu; Een-Kee Hong, Kyung Hee University

2 **Modeling of Power Consumption for Macro-, Micro-, and RRH-based Base Station Architectures**
Byoung Hoon Jung, Korea Advance Institute of Science and Technology; Hansung Leem, KAIST; Dan Keun Sung, Korea Advanced Institute of Science and Technology

3 **A Resource Allocation Game for Femtocell Networks and Constrained Equilibria**
In Sop, Cho, Seung Jun Baek, Korea University

4 **Energy-Efficient Power Control with Time-Domain Scheduling in Heterogeneous Networks**
Yaguang Wu, Hailun Xia, Chunyan Feng, Rui Han, Cong Du, Beijing University of Posts and Telecommunications

5 **An Efficient Physical Resource Block Assignment for Dense Femtocell Networks**
Sudeepta Mishra, Rahul Thakur, C. Siva Ram Murthy, Indian Institute of Technology Madras

Tuesday 20 May 10:30-12:00 Studio 3

4C: Interference Management 1

Chair: Sun Sumei, I2R, Singapore

1 **Base Station Downlink DTX Designs for Interference Mitigation in High-Performance LTE Networks**
Sorour Falahati, Ericsson AB; Jung-Fu (Thomas) Cheng, Ericsson Research Silicon Valley; Havish Koorapaty, Ericsson; Daniel Larsson, Ericsson AB

2 **The Inter-Cell Interference Dilemma in Dense Outdoor Small Cell Deployment**
Michele Polignano, Aalborg University; P. E. Mogensen, Nokia Solutions & Networks; Panagiotis Fotiadis, Lucas Chavarria Gimenez, Aalborg University; Ingo Viering, Nomor Research GmbH; Paolo Zanier, Nokia Solutions and Networks

3 **Short Data Transmission with Least Resource in Machine Type Communications**
Seung Nam Choi, ETRI

4 **Cooperative Spectrum Leasing to Femtocells with Interference Compensation**
Yang CHungang, Li Jiandong, University of XiDian

5 **Effective Interference Coordination for D2D Underlaying LTE Networks**
Shaoyi Xu, Beijing Jiaotong University; Kyungsup Kwak, Inha University

Tuesday 20 May 10:30-12:00 Studio 4

4D: Spectrum Sharing

Chair: Sang-Jo Yoo, Inha Univ, Korea

1 **Simple Diversity Techniques for Cyclostationarity Detection based Spectrum Sensing in Cognitive Radio Networks**
Shusuke Narieda, Akashi National College of Technology

2 **Round-robin Resource Sharing Algorithm for Device-to-Device Communications underlying SFN Systems**
Wenrong Gong, Wang Xiaoxiang, Mingming Li, Zijia Huang, Beijing University of Posts and Telecommunications

3 **Outage Performance for Cognitive Two-Way Relaying Networks with Underlay Spectrum Sharing**
Hao Hong, Limin Xiao, Jing Wang, Tsinghua University

4 **Dynamic Spectrum Sharing for TD-LTE & FD-LTE users based on Joint Polarization Adaption and Beamforming**
Dongming Li, Caili Guo, Zhimin Zeng, Xiaolin Lin, Beijing University of Posts and Telecommunications

5 **A Novel Price-based Algorithm for Spectrum Sharing in Cognitive Radio Networks**
Bih-Hwang Lee, Meng-Dung Weng, National Taiwan University of Science and Technology; Huai-Kuei Wu, Ling Tung University

Tuesday 20 May 10:30-12:00 Studio 5

4E: Transmission Techniques 1

Chair: Sunwoo Kim, Hanyang University, Korea

1 **Information Rates for Faster-Than-Nyquist Signaling with 1-Bit Quantization and Oversampling at the Receiver**
Tim Haelsig, Lukas Landau, Gerhard Fettweis, Technische Universität Dresden

2 **Two are Better Than One: Adaptive Sparse System Identification using Affine Combination of Two Sparse Adaptive Filters**
Guan Gui, Shinya Kumagai, Abolfazl Mehbodniya, Fumiyuki Adachi, Tohoku University

3 **Shaping Spectral Leakage for IEEE 802.11p Vehicular Communications**
Thinh Hung PHAM, Nanyang Technological University; Ian Vince McLoughlin, The University of Science and Technology of China; Suhaib A. Fahmy, Nanyang Technological University

4 **An adaptive CU depth selection mechanism based on visual sensitivity for HEVC inter coding**
Qin Tu, Beijing University of Posts and Telecommunications; Xiaoqiang Guo, Academy of Broadcasting Science; Aidong Men, Beijing University of Posts and Telecommunications

5 **A Distributed Compressed Sensing Scheme Based on One-Bit Quantization**
Yun Tian, Wenbo Xu, Beijing University of Posts and Telecommunications; Yue Wang, Huawei Technologies Co., Ltd.; Hongwen Yang, Beijing University of Posts and Telecommunications

Tuesday 20 May 10:30-12:00 Studio 8

4F: Relaying & Routing

Chair: Song Chong, KAIST, Korea

1 **Social Contact Probability Assisted Routing Protocol for Mobile Social Networks**
Pitiphol Pholpabu, Lie-Liang Yang, University of Southampton

2 **A Low Complexity Algorithm for Selective AF-OFDM System**
Hanan Al Tous, Imad Barhumi, United Arab Emirates University

3 **Popularity-Aided Routing Protocol for Mobile Social Networks**
Ibrahim A. Hemadeh, Lie-Liang Yang, University of Southampton

4 **Spreading Sequence Design for partial Connectivity Relay Network**
Jie Yang, Kanghee Lee, Shuang Feng, Hyuck M. Kwon, Wichita State University; Hyuncheol Park, KAIST

5 **Maximum SNR Relaying Strategies for AF SIMO Wireless Relay Network**
Kanghee Lee, Hyuck M. Kwon, Jie Yang, Edwin Sawan, Wichita State University; Hyuncheol Park, KAIST

Tuesday 20 May 10:30-12:00 Studio 9

4G: Beamforming

Chair: Chang Kyung Sung, CSIRO, Australia

1 **Beamforming Aided Interference Management with Improved Secrecy for Correlated Channels**
Guido Dartmann, RWTH Aachen University; Özge Cepheli, Gunes Kurt, Istanbul Technical University; Gerd Ascheid, RWTH Aachen University

2 **Cooperative Beamforming in Cognitive Radio Network with Two-Way Relay**
Jianwei Zhang, Li Guo, Tianyu Kang, Peng Zhang, Beijing University of Posts and Telecommunications

3 **Field Experiment on Precoding-Based Vertical Plane Beam Control for LTE Systems**
Kenji Hoshino, SOFTBANK MOBILE Corp.; Sho Nabatame, Atsushi Nagate, Softbank Mobile Corp.; Teruya Fujii, Softbank Mobile

4 **Leakage-Based Distributed MMSE Beamforming for Relay-Assisted C-RAN**
Na Li, Zesong Fei, Chengwen Xing, Beijing Institute of Technology; Liang Sun, Ming Lei, NEC laboratories, China

5 **Decentralized Beamforming for Multicell System Based on Internal Penalty Function**
Zijia Huang, Xiaoxiang Wang, Wang Xianan, Wenrong Gong, Beijing University of Posts and Telecommunications

Tuesday 20 May 10:30-12:00 Studio 10

4H: MIMO System 1

Chair: Young-Chai Ko, Korea University, Korea

1 **An Efficient Rank Adaptation Algorithm for Cellular MIMO Systems with IRC Receivers**
Nurul Huda Mahmood, Gilberto Berardinelli, Fernando Tavares, Mads Lauridsen, Preben E. Mogensen, Aalborg University; Kari Pajukoski, Nokia-Siemens Networks, Oulu, Finland

2 **Improvement of Explicit Channel Feedback for MIMO-OFDM WLAN and Its Implementation**
Min-Ching Chen, Pei-Yun Tsai, National Central University

3 **Investigation of Degradation Factors for Adaptive Modulation and Coding in OFDM-MIMO Multiplexing**
Bing Han, Tokyo City University; Teruo Kawamura, Yuichi Kakishima, NTT DOCOMO, INC.; Mamoru Sawahashi, Tokyo City University

4 **The Effect of Imperfect CSI in a Multi-Cell Multi-User MIMO System**
Oskari Tervo, Petri Komulainen, Markku Juntti, University of Oulu

5 **Expectation Propagation Based Iterative Multi-User Detection for MIMO-IDMA Systems**
Xiangming Meng, Sheng Wu, Linling Kuang, Zuyao Ni, Jianhua Lu, Tsinghua University

Tuesday 20 May 13:30-15:00 Studio 2

5B: Network Performance Analysis 1

Chair: Bhamri Ankit, Aalto University, Finland

1 Impact of Traffic Geolocation Errors on Self-Organizing Network Performance
Felix Kirsten, Henrik Klessig, Technische Universität Dresden; Andreas Hecker, Actix GmbH; Gerhard Fettweis, Technische Universität Dresden

2 Enhancing Channel Reciprocity for Effective Key Management in Wireless Ad-hoc Networks
Abhijit Ambekar, Hans Schotten, University of Kaiserslautern

3 Mobility Performance of Macrocell-Assisted Small Cells in Manhattan Model
Murat Karabacak, University of South Florida; Dexin Wang, Colorado State University; Hiroyuki Ishii, NTT DOCOMO, INC.; Hüseyin Arslan, University of South Florida - USA

4 Coverage Optimization Trade-Offs in Heterogeneous W-CDMA Networks with Co-Channel Small Cells
Stepan Kucera, Lester Ho, Rouzbeh Razavi, Holger Claussen, Alcatel-Lucent

5 Capacity Upper Bound for Adding Cells in the Super Dense Cellular Deployment Scenario
Yi Wu, Peter Butovitsch, Meng Zhang, Ericsson

Tuesday 20 May 13:30-15:00 Studio 3

5C: Power Control

Chair: Fernando Velez, Instituto de Telecomunicationes, Portugal

1 A Transmit Power Control based Interference Mitigation Scheme for Small Cell Networks using Dynamic TDD in LTE-Advanced Systems
Hiroki Takahashi, Kazunari Yokomakura, Kimihiko Imamura, Sharp Corporation

2 Multi-User Diversity with Optimal Power Allocation in Spectrum Sharing under Average Interference Power Constraint
Fotis Foukalas, Tamer Khattab, Qatar University

3 GA based User Matching with Optimal Power Allocation in D2D underlaying Network
Chengcheng Yang, Jiang Han, Xiaodong Xu, Tao Xiaofeng, Beijing University of Posts and Telecommunications

4 Game-Theoretic Power Control for Interference Mitigation in Two-tier Small Cell Networks
Yuanyuan Wang, Institute of Computing Technology, Chinese Academy of Science; Manli Qian, Institute of Computing Technology, Chinese Academy of Sciences; Han Xue, Institue of China Academy; Yiqing Zhou, Jinglin Shi, Institute of Computing Technology, Chinese Academy of Sciences

5 Adaptive Downlink Power Control for Co-Channel Femtocells in OFDMA Cellular Networks
Prabhu Chandhar, Suvra Sekhar Das, Indian Institute of Technology, Kharagpur

Tuesday 20 May 13:30-15:00 Studio 4

5D: D2D

Chair: Jingxian Wu, University of Arkansas, USA

1 Clustering Schemes for D2D Communications Under Partial/No Network Coverage
Lu Qianxi, Ericsson Research; Miao Qingyu, Ericsson China; Gabor Fodor, Nadia Brahmi, Ericsson Research

2 Adaptive Yielding Scheme for Link Scheduling in OFDM-based Synchronous D2D Communication System
Chung Gu Kang, Jin Wook Kim, Hye-J. Kang, Korea University; Minjoong Rim, Dongguk University

3 Opportunistic mode selection and RB Assignment for D2D underlay operation in LTE networks
Furqan Hameed Khan, Seoul National University; Young-June Choi, Ajou University; Saewoong Bahk, Seoul National University

4 Discovering Mobile Applications in Device-to-Device Communications: Hash Function and Bloom Filter-Based Approach
Kae-Won Choi, Seoul National University of Science and Technolgoy

5 Network Assisted Device Discovery for D2D underlying LTE-Advanced Networks
Shaoyi Xu, Beijing Jiaotong University; Kyungsup Kwak, Inha University

Tuesday 20 May 13:30-15:00 Studio 5

5E: Transmission Techniques 2

Chair: Suk Chan Kim, Pusan National University, Korea

1 A Chain Based Syndrome Coding Scheme for Secure Communication in the Wiretap Channel
Ke Zhang, Faculdade de Ciencias da Universidade do Porto / IT Porto; Miguel R. D. Rodrigues,, University College London; Martin Tomlinson, Mohammed Zaki Ahmed, University of Plymouth

2 Analysis of Information Reconciliation in Secret Key Agreement from the AWGN Channel
Kana Deguchi, Motohiko Isaka, Kwansei Gakuin University

3 A Tunable Multiuser Grouping and Chunk Allocation Algorithm for Controlling Fairness-Capacity Tradeoff in SC-FDMA/SDMA
Abolfazl Mehbodniya, Fumiyuki Adachi, Tohoku University

4 An eigen-based spreading sequences design framework for CDMA satellite systems
Na Gu, Linling Kuang, Xiang Chen, Zuyao Ni, Jianhua Lu, Tsinghua University

5 Tight Semidefinite Relaxation for Combinatorial Optimization in UWB Multiuser Detection Systems
Chanfei Wang, Tiejun Lv, Anzhong Hu, Hui Gao, Beijing University of Posts and Telecommunications

Tuesday 20 May 13:30-15:00 Studio 8

5F: OFDM

Chair: Jeong Gon Kim, Korea Polytechnic University, Korea

1 On the Optimum Performance of Nonlinearly Distorted OFDM Signals
João Guerreiro, Rui Dinis, Paulo Carvalho, FCT- Universidade Nova de Lisboa

2 On the potential of OFDM enhancements as 5G waveforms
Gilberto Berardinelli, Aalborg University; Kari Pajukoski, Eeva Lähetkangas, Nokia Siemens Networks; Risto Wichman, Helsinki University of Technology; Olav Tirkkonen, Aalto University; Preben E. Mogensen, Aalborg University

3 Optimal Resource Allocation for Type-II HARQ based OFDMA Ad Hoc Networks under Individual Rate and PER Constraints
Nassar Ksairi, Philippe Ciblat, Telecom ParisTech; Christophe Le Martret, Thales Communications

4 OFDM With Spectral Precoding and Specific-band Power Minimization
Tsung-Wei Wu, Wei-Chang Chen, Yi-Min Huang, National Taiwan University; Char-Dir Chung, National Taiwan University, Taiwan, R.O.C; BingLi Jiao, Peking University

5 Mutual Superposition Transmission for Spatial Multiplexing OFDM Systems
Takahiko Saba, Chiba Institute of Technology

Tuesday 20 May 13:30-15:00 Studio 9

5G: Interference Management 2

Chair: Kyungchun Lee, SNUST, Korea

1 Inter-cell interference field test results and coordination methods with the deployment of TD-LTE in-band relay
Fan Rui, Qian Yu, Zhiheng Guo, Hai Wang, Ericsson; Jianjun Liu, Hu Zhengpin, China Mobile Research Institute

2 Validation of an inter-cell interference coordination solution in real-world deployment conditions
Oscar Tonelli, Ignacio Rodriguez, Gilberto Berardinelli, Andrea Fabio Cattoni, Jakob L. Buthler, Troels B. Sørensen, Aalborg University; P. E. Mogensen, Nokia Solutions & Networks

3 Moving-Average Based Interference Suppression on Frequency Selective SIMO Channels
Chien-Chun Cheng, NCTU, Taiwan; Supélec, France; Serdar Sezginer, Sequans Communications; Hikmet Sari, Supelec; Yu Ted Su, National Chiao Tung University

4 Applying FFR to Inter-Cell Interference Cancellation with Quasi-Decentralized Base Station Cooperation
Kazuki Maruta, NTT Access Network Service Systems Laboratories; Atsushi Ohta, NTT Corporation; Masataka Iizuka, Takatoshi Sugiyama, NTT Access Network Service Systems Laboratories

5 Blind Interference Neutralization in 3-Cell Interference Channel with Shared Relay
Ou Bai, Tiejun Lv, Hui Gao, Beijing University of Posts and Telecomms

Tuesday 20 May 13:30-15:00 Studio 10

5H: Multiuser-MIMO

Chair: Youngchul Sung, KAIST, Korea

1 On the impact of receiver imperfections on the MMSE-IRC receiver performance in 5G networks
Fernando Tavares, Gilberto Berardinelli, Nurul Huda Mahmood, Troels B. Sørensen, Preben E. Mogensen, Aalborg University

2 BD-QRD, Block THP and Constrained Sphere Decoding for Multi-user MIMO Systems
Chi-Mao Chen, Pei-Yun Tsai, National Central University; Chia-Wei Chen, National Taiwan University

3 Effects of Spatial Correlation on the Sum Rate Distribution of ZF Receivers in MU-MIMO Systems
Ou Zhao, Hidekazu Murata, Kyoto University

4 Robust Power Allocation Based Game Theory for Multi-user MIMO System with SLNR Precoding
Xian-Zhong Xie, Helin Yang, Weijia Lei, Bin Ma, Chongqing University of Posts & Telecommunications

5 Multiuser MIMO Scheduling for LTE-A Downlink Cellular Networks
Jiancun Fan, Xi'an Jiaotong University; Geoffrey Y. Li, Georgia Tech; Xiaolong Zhu, Huawei Shanghai Research Institute

Tuesday 20 May 15:30-17:00 Studio 2

6B: Network Performance Analysis 2

Chair: Jemin Lee, Singapore University of Technology and Design, Singapore

1 Handoff Rates for Millimeterwave 5G Systems
Anup Talukdar, Nokia Solutions and Networks; Mark Cudak, Amitava Ghosh, Nokia Siemens Networks

2 Three-step Iterative Scheduler for QoS Provisioning to Users Running Multiple Services in Parallel
Ankit Bhamri, Aalto University; Navid Nikaein, Florian Kaltenberger, Eurecom; Jyri Hämäläinen, Aalto University, Comnet; Raymond Knopp, Eurecom

3 Double Threshold Design for Mobility Load Balancing in Self-Optimizing Networks
Yang CHungang, Min Sheng, Haipeng Tian, Li Jiandong, University of XiDian

4 Location-Based Handover Decision Algorithm in LTE Networks Under High-Speed Mobility Scenario
Mingming Chen, Yangyan, Zhangdui Zhong, Beijing Jiaotong University

5 Evaluation of High-speed Train Communication Handover Models Based on DEA
Yuzhe Zhou, Bo Ai, Beijing Jiaotong University

Tuesday 20 May 15:30-17:00 Studio 3

6C: Load Balancing and Scheduling

Chair: Christoph Ide, Technische Universitat at Dortmund, Germany

1 Load Balancing with Antenna Tilt Control in Enhanced Local Area Architecture
Bo Yu, Liuqing Yang, Colorado State University; Hiroyuki Ishii, DOCOMO Innovations, INC.; Xiang Cheng, Peking University

2 Multi-User Proportional Fair Scheduling for Uplink Non-orthogonal Multiple Access (NOMA)
Xiaohang Chen, DOCOMO Beijing Communications Laboratories Co., Ltd.; Anass Benjebbour, NTT DOCOMO, INC.; Anxin Li, Atsushi Harada, DOCOMO Beijing Communications Laboratories Co., Ltd

3 Energy-constrained Wi-Fi Offloading Method Using Prefetching
Yoshihisa Onoue, Morihiko Tamai, Keiichi Yasumoto, Nara Institute of Science and Technology

4 Analysis of a Call Admission Control Algorithm for Real-Time Traffic in OFDMA Based Cellular Networks
Subhendu B, Suvra Sekhar Das, Indian Institute of Technology, Kharagpur

5 Cell Load Coupling Framework for Load Balancing and ICI Coordination in OFDMA Cellular Networks
Prabhu Chandhar, Suvra Sekhar Das, Indian Institute of Technology, Kharagpur

Tuesday 20 May 15:30-17:00 Studio 4

6D: Non-orthogonal Multiple Access

Chair: Tallal El-Shabrawy, German University, Egypt

1 LLR Calculation based on Interference Cancelation for Non-orthogonal Multiple Access
Yuji Chida, Yukitoshi Sanada, Keio University

2 System-Level Throughput of Non-orthogonal Access with SIC in Cellular Downlink When Channel Estimation Error Exists
Kenta Yamamoto, Tokyo University of Science; Yuya Saito, NTT docomo, INC.; Kenichi Higuchi, Tokyo University of Science

3 Non-orthogonal Access with SIC Using Inter-cell Interference Coordination Based on Coordinated Power Control for Cellular Uplink
Hiromi Katayama, Kenichi Higuchi, Tokyo University of Science

4 Performance Evaluation of Non-orthogonal Multiple Access Combined with Opportunistic Beamforming
Anxin Li, Anass Benjebbour, Atsushi Harada, DOCOMO Beijing Communications Laboratories Co., Ltd

5 Efficient and Dynamic Fractional Frequency Reuse for Downlink Non-orthogonal Multiple Access
Yang Lan, Anass Benjebbour, Anxin Li, Atsushi Harada, DOCOMO Beijing Communications Laboratories Co., Ltd

Tuesday 20 May 15:30-17:00 Studio 5

6E: Transmission Techniques 3

Chair: Jinho Choi, Gwangju Institute of Science and Technology, Korea

1 An Inter-layer Protection Scheme with Block-based Interleaving for MPEG-DASH over WiFi Multicast
Shih-Ying Chang, Hsin-Ta Chiao, Industrial Technology Research Institute

2 Is Sampling Jitter a Problem in Full-Duplex Radio Transceivers or Not?
Ville Syrjälä, Koji Yamamoto, Kyoto University

3 A Frame-Level HEVC Rate Control Algorithm For Videos With Complex Scene Over wireless network
Qin Tu, Beijing University of Posts and Telecommunications; Xiaoqiang Guo, Academy of Broadcasting Science; Aidong Men, Ji Qi, Jun Xu, Beijing University of Posts and Telecommunications

4 Compressed Sensing Reconstruction Algorithms With Prior Information: Logit Weight Simultaneous Orthogonal Matching Pursuit
Zhilin Li, Wenbo Xu, Yun Tian, Beijing University of Posts and Telecommunications; Yue Wang, Huawei Technologies Co., Ltd.; Jiaru Lin, Beijing University of Posts and Telecommunications

5 Secrecy Outage of Dual-hop Amplify-and-Forward System and its Application to Relay Selection
Abhishek Jindal, Chinmoy Kundu, Ranjan Bose, Indian Institute of Technology, Delhi

Tuesday 20 May 15:30-17:00 Studio 8

6F: Cellular Networks

Chair: Tony Quek, SUTD, Singapore

1 Cell Planning with Macroscopic Diversity: Optimal Cell Deployment and SINR Evaluation under Frequency Scheduling
Yasuhiro Ikeda, Hiroshi Saito, Ryoichi Kawahara, NTT Network Technology Laboratories

2 Relay-Assisted Dynamic Load Balancing Scheme in Multi-Cell Cellular Networks
Won-Tae Yu, Jeongsik Choi, Seong-Cheol Kim, Seoul National University

3 User Cooperation with Interference Forwarding in a Cellular System
Hojin Song, Jong Yeol Ryu, Wan Choi, KAIST

4 An Enhanced Coherent Joint Transmission Algorithm for Multi-Cell Downlink Transmission
Huan Sun, Xun Li, Alcatel-Lucent Shanghai Bell

5 A Dynamic Clustering Algorithm Design for C-RAN Based on Multi-Objective Optimization Theory
Xi Chen, Na Li, Jing Wang, Chengwen Xing, Beijing Institute of Technology; Sun Liang, NEC Lab, China; Ming Lei, NEC laboratories, China

Tuesday 20 May 15:30-17:00 Studio 9

6G: Resource Allocation 2

Chair: Young-Chai Ko, Korea University, Korea

1 Resource Allocation for Decode-and-forward Relay Assisted Networks with Service Differentiation
Md Shamsul Alam, Amila Tharaperiya Gamage, Jon W. Mark, Xuemin (Sherman) Shen, University of Waterloo

2 Optimal Energy-Efficient Power Allocation for Multiuser Relay Networks
Keshav Singh, Meng-Lin Ku, Jia-Chin Lin, National Central University

3 Robust Resource Allocation for Bidirectional Decode-and-Forward OFDM Relaying Systems with Network Coding and Imperfect CSI
Xiaolin Ma, Wuhan University of Technology, Dalhousie University; Fangmin Li, Wuhan University of Technology; Jacek Ilow, David Chen, Dalhousie University

4 Power Allocation and Jammer Selection of a Cooperative Jamming Strategy for Physical-Layer Security
Chin-Liang Wang, Ting-Nan Cho, National Tsing Hua University; Feng Liu, Xi'an Jiaotong University

5 Joint Multi-Cell Resource Allocation Using Pure Binary-Integer Programming for LTE uplink
Tong Zhang, Tao Xiaofeng, Cui Qimei, Beijing University of Posts and Telecommunications

Tuesday 20 May 15:30-17:00 Studio 10

6H: Interference Management 3

Chair: Jungwoo Lee, Seoul National University, Korea

1 Interference modelling using hierarchical spatial clustering of terrain and user density maps
Konstantinos Koufos, Riku Jäntti, Aalto University

2 Blind Maximum Likelihood Interference Cancellation for LTE-Advanced Systems
Alexei Davydov, Intel Corporation; Gregory Morozov, Intel; Apostolos Papathanassiou, Intel Corporation

3 SINR Enhancement of Interference Rejection Combining for the MIMO Interference Channel
Chien-Chun Cheng, NCTU, Taiwan; Supélec, France; Serdar Sezginer, Sequans Communications; Hikmet Sari, Supelec; Yu Ted Su, National Chiao Tung University

4 Coordinated Interference Management Based on Potential Game in MultiCell OFDMA Networks with Diverse QoS Guarantee
Jun Zhao, Beijing University of Posts and Telecommunications (BUPT); Haijun Zhang, Beijing University of Chemical Technology; Wei Zheng, Zhaoming Lu, BUPT; Wen Xiangming, Beijing University of Posts and Telecommunications; Xidong Wang, BUPT

5 Quantization in Uplink Multi-Cell Processing with Fixed-order Successive Interference Cancellation Scheme under Backhaul Constraint
Shipeng Wang, Li Chen, Ying Yang, Guo Wei, University of Science and Technology of China

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Wednesday 21 May 8:30-10:00 Studio 1

7A: Antenna

Chair: Junhwan Lee, ETRI, Korea

1 Experimental Characterization of Wearable Antennas and Circuits for RF Energy Harvesting in WBANs
Henrique M. Saraiva, Luis Borges, Norberto Barroca, Jorge Tavares, Paulo T. Gouveia, Fernando J Velez, IT-DEM, University of Beira Interior; Caroline Loss, Rita Salvado, Textile and Paper Materials, University of Beira Interior; Pedro Pinho, Instituto Superior de Engenharia de Lisboa; Ricardo Gonçalves, Nuno Borges de Carvalho, Instituto de Telecomunicações, University of Aveiro; Raúl Chávez-Santiago, Ilangko Balasingham, Oslo University Hospital

2 Identification of Non-ideal Receiver Condition for Orbital Angular Momentum Transmission
Dongwoo Shin, Eunhye Park, Jinkyu Kang, Jungho Myung, Joonhyuk Kang, KAIST

3 Online Method to Determine Nonlinear Characteristics of PA with Short Updating Intervals for LTE- Advanced Systems
Eisuke Fukuda, Yasuyuki Oishi, Takeshi Takano, Fujitsu Laboratories Ltd.; Daisuke Takago, Yoshimasa Daido, Kanazawa Institute of Technology; Hiroyuki Morikawa, The University of Tokyo

4 Cell Searching and DoA Estimation for a Mobile Station with Antenna Array in mm-Wave Cellular Communications
Rothna Pec, Kyu Seok Kim, In Su Kim, Yong Soo Cho, Chung-Ang University

5 Integrated Lee Models
David Lee, Cisco; William C. Y. Lee, Beijing University

Wednesday 21 May 8:30-10:00 Studio 2

7B: Network Coding

Chair: Stepan Kucera, Bell Labs, Ireland

1 Sharing the Pi: Testbed Description and Performance Evaluation of Network Coding on the Raspberry Pi
Achuthan Paramanathan, Peyman Pahlevani, Simon Thorsteinsson, Martin Hundebøll, Daniel Lucani, Frank H.P. Fitzek, Aalborg University

2 TCP Acknowledgement Encapsulation in Coded Multi-hop Wireless Networks
David Gómez, Universidad de Cantabria; Ramon Aguero, Marta García, University of Cantabria; David Ros, TELECOM Bretagne

3 A Perpetual Code for Network Coding
Janus Heide, Steinwurf; Morten V. Pedersen, Frank H.P. Fitzek, Aalborg University; Muriel Médard, Massachusetts Institute of Technology

4 Peer-Assisted Content Distribution with Random Linear Network Coding
Martin Hundebøll, Jeppe Ledet-Pedersen, Georg Sluyterman, Tatiana Madsen, Frank H.P. Fitzek, Aalborg University

5 Comparative Study of SC-FDMA and OFDMA Using Turbo SIC Considering Soft-Symbol Estimate for MIMO SDM
Chihiro Mori, Tokyo City University; Teruo Kawamura, Hidekazu Taoka, NTT DOCOMO; Mamoru Sawahashi, Tokyo City University

Wednesday 21 May 8:30-10:00 Studio 3

7C: Heterogeneous Network 1

Chair: Pal Frenger, Ericsson, Sweden

1 Evaluation of Mobility Performance and Deployment Scenarios in UMTS Heterogeneous Networks
Wang Min, Edgar Ramos, Ericsson Research; Y.-P. Eric Wang, Namir Lidian, Ericsson; Sairamesh Nammi, Ericsson, NMSU, Nortel Networks; Mark Curran, Ericsson

2 LTE HetNet Mobility Performance Through Emulation with Commercial Smartphones
Anders Riis Jensen, Klaus I. Pedersen, Aalborg University; Janus Faaborg, Agilent Technologies; Preben E. Mogensen, Aalborg University

3 Performance Evaluations of Cell Search Time for Heterogeneous Cell Structure
Naoki Noguchi, Tokyo City University; Satoshi Nagata, NTT DOCOMO, INC.; Mamoru Sawahashi, Tokyo City University

4 Delay Performance Optimization of Multiaccess for Uplink in Heterogeneous Networks
Jiandong Li, Jie Zheng, Qin Liu, Xidian University; Xiaoniu Yang, No.36 Research Institute of CETC

5 Q-learning Based Network Selection for WCDMA/WLAN Heterogeneous Wireless Networks
Yubin Xu, Harbin Institute of Technology; Jiamei Chen, Lin Ma, Gaiping Lang, Communication Research Center Harbin Institute of Technology

Wednesday 21 May 8:30-10:00 Studio 4

7D: Resource Allocation 3

Chair: Hirantha Abeysekera, NTT, Japan

1 A Resource Allocation Scheme for Heterogeneous Networks Using Dynamic Programming Approach
Ahmed Elsherif, Zhi Ding, Xin Liu, University of California, Davis

2 Downlink Resource Allocation for a Network using Femto-Base Stations as Relays to Macro-Users
Ayush Rastogi, Samsung Electronics Corporation; Jinhyun Park, J. H. Lee, Seoul National University

3 Utility-Based Resource Allocation with Spatial Multiplexing for Real Time Services in Multi-User OFDM Systems
Emanuel Bezerra Rodrigues, Francisco Hugo C. Neto, Federal University of Ceará; Tarcisio F. Maciel, Wireless Telecom Research Group (GTEL); Rafael Lima, F. Rodrigo P. Cavalcanti, Federal University of Ceará

4 Radio Resource Management Based on QoE-aware Model for Uplink Multi-Radio Access in Heterogeneous Networks
Yujae Song, Yonghoon Choi, Youngnam Han, Korea Advanced Institute of Science and Technology

5 Joint Resource Allocation for Multi-User and Two-Way Multi-Relay OFDMA Networks
Guixian Xu, Beijing University of Posts and Telecommunications

Wednesday 21 May 8:30-10:00 Studio 5

7E: Coding 1

Chair: Seung-Hoon Hwang, Dongguk University, Korea

1 Adaptive Modulation and Turbo Coding for 3GPP LTE Systems with Limited Feedback
Konstantinos Manolakis, Technische Universität Berlin; Miguel Guiterrez, Fraunhofer Heinrich-Herz Institute; Volker Jungnickel, Fraunhofer Insitute

2 IRA Code Design for Iterative Detection and Decoding: A Setpoint-based Approach
Florian Lenkeit, Carsten Bockelmann, Dirk Wübben, Armin Dekorsy, University of Bremen

3 Improving LT Decoding for Real-Time Applications Over Wireless Erasure Channels
Rouzbeh Razavi, Bell Labs, Alcatel-Lucent

4 Iterative Decoding of Network Coding HARQ in LDPC System
Yue Wu, Olawoyin L.A., Hongwen Yang, Beijing University of Posts and Communications

5 Practical Full Duplex Physical Layer Network Coding
Semiha Tedik, Gunes Kurt, Istanbul Technical University

Wednesday 21 May 8:30-10:00 Studio 8

7F: Vehicular Communications

Chair: Hyoil Kim, UNIST, Korea

1 Empirical Evaluation of Cooperative Awareness in Vehicular Communications
Pedro M. d'Orey, Mate Boban, NEC Laboratories Europe

2 Spectrum Requirement for Vehicle-to-Vehicle Communication for Traffic Safety
Lei Shi, Ki Won Sung, KTH Royal Institute of Technology

3 A Transit Signal Control and Communication System using IEEE 802.11(p)/1609 Radios
Chih-Wei Hsu, Michael Li, Industrial Technology Research Institute

4 Scaling the Real-time Traffic Sensing with GPS Equipped Probe Vehicles
Peng-Jui Tseng, Chia-Chen Hung, Yu-Hsiang Chuang, Kuo Kao, Wei-Hui Chen, Chunghwa Telecom

5 Efficient Authentication Protocol for Secure Vehicular Communications
Bidi Ying, Zhejiang Gongshang University; Amiya Nayak, University of Ottawa

Wednesday 21 May 8:30-10:00 Studio 9

7G: Relay Selection

Chair: Ji-Woong Choi, DIGST, Korea

1 An MGF-Based Performance Analysis of Opportunistic Relay Selection with Outdated CSI
Wei Jiang, Hanwen Cao, Thomas Kaiser, University of Duisburg-Essen

2 A Contract-Auction Mechanism for Multi-Relay Cooperative Wireless Networks
Bahareh Nazari, Abbas Jamalipour, University of Sydney

3 Joint Energy-Efficient Single Relay Selection and Power Allocation for Analog Network Coding with Three Transmission Phases
Basem M. ElHalawany, Egypt-Japan University of Science & technology; Maha Elsabrouty, Egypt-Japan University for Science and

Technology; Adel B. Abdel-Rahman, South Valley University; Osamu Muta, Hiroshi Furukawa, Kyushu University

4 Performance of Multihop Communication Systems with Regenerative Relays in eta-mu Fading Channels
Dharmendra Dixit, The LNMIIT, Jaipur, Rajasthan India; Pravas Ranjan Sahu, Indian Institute of Technology Bhubaneswar, India

5 Time-Selective and Frequency-Selective Relay-Based Channel Capacity for Wireless Communication Systems in High-Speed Railway Environment
Yang Liu, Zhangdui Zhong, Gongpu Wang, Rongtao XU, Beijing Jiaotong University

Wednesday 21 May 8:30-10:00 Studio 10

7H: Interference Management 4

Chair: Chan-Byoung Chae, Yonsei University, Korea

1 Blind Maximum Likelihood Interference Mitigation for PDCCH of 3GPP LTE/LTE-A
Gregory Morozov, Intel; Alexei Davydov, Intel Corporation

2 Max K-CUT Based Clustering for Interference Mitigation and Traffic Adaptation in TDD Systems
Mingliang Tao, Cui Qimei, Yateng Hong, Ting Fu, Hui Liang, Beijing University of Posts and Telecommunications

3 Robust Transceiver with Switched Preprocessing for K-Pair MIMO Interference Channels
Yunlong Cai, Ming-Min Zhao, Zhejiang University; Benoit Champagne, McGill University; Minjian Zhao, University of Zhejiang

4 Rate and UE Selection Algorithms for Interference-Aware Receivers
Vitaly Abdrashitov, Massachusetts Institute of Technology; Wooseok Nam, KAIST; Dongwoon Bai, Samsung Mobile Solutions Lab

5 A More Accurate Outage Analysis for ZF-Based MIMO AF Two-Way Relaying by Order Statistics
Rongsheng Li, Tiejun Lv, Hui Gao, Beijing University of Posts and Telecommunications

Wednesday 21 May 10:30-12:00 Studio 1

8A: RF Design

Chair: Bonghyuk Park, ETRI, Korea

1 RF Wideband Power Amplifier Performance Improvement with Reconfigurable Matching Networks
José-Ramón Pérez-Cisneros, Paloma Garcia-Ducar, Pedro Luis Carro, Antonio Valdovinos, Jesús de Mingo, University of Zaragoza

2 Bandwidth Potential, Electromagnetic and Duplex Isolation of Tunable Capacitive Coupling Element Antennas for 4G Smartphones
Mauro Pelosi, Aalborg University; Francescantonio Della Rosa, Tampere University of Technology

3 The Impact of Jitter on the Signal-to-Noise Ratio in Uniform Bandpass Sampling Receivers
Bjoern Almeroth, Gerhard Fettweis, Technische Universität Dresden

4 Symbolic Analysis of Input Impedance of CMOS Floating Active Inductors with Application in Fully Differential
Kittipong Tripetch, Rajamangala University of Technology Suvarnabhumi

5 Optimization algorithms for designing a Two-section Dual-band Transformer
Yaqiao Luo, Beijing University of Posts and Communications

Wednesday 21 May 10:30-12:00 Studio 2

8B: Wireless Networks

Chair: Abhijit Ambekar, University of Kaiserslautern, Germany

1 Impact of Co-Channel Small Cell Deployments On Uplink Capacity of W-CDMA Cellular Networks
Stepan Kucera, Holger Claussen, Alcatel-Lucent

2 A Study on Networking Scheme of Indoor Visible Light Communication Networks
Liu Yang, National Digital Switching System Engineering & Technological Center

3 Mobile Relay Station with Radiation Pattern Reconfigurable Antenna
Wei Wang, Shaowei Liao, Wei Ni, Gang Shen, Xun Li, Alcatel-Lucent Shanghai Bell

4 Study the Voice QoE for Speech Codec in Chinese Environment
Weiwei Zhang, Yongyu Chang, Yitong Liu, Leilei Xiao, Beijing University of Posts and Telecommunications; Yuan Tian, Chinese Academy of Sciences

5 Distributed Algorithm for Multi-Channel Wireless Networks with Low Complexity
Fan Zhang, Yewen Cao, Deqiang Wang, Shandong University

Wednesday 21 May 10:30-12:00 Studio 3

8C: Heterogeneous Network 2

Chair: Ren-Huang Liou,, National Chiaotung University, Taiwan

1 On the Potentials of Traffic Steering in HetNet Deployments with Carrier Aggregation
Panagiotis Fotiadis, Michele Polignano, Aalborg University; Ingo Viering, Nomor Research GmbH; Paolo Zanier, Nokia Solutions and Networks

2 Wireless Backhaul in Small Cell Networks: Modeling and Analysis
Daniel C. Chen, Massachusetts Institute of Technology; Tony Q.S. Quek, Singapore University of Technology and Design; Marios Kountouris, SUPELEC

3 Evaluation of Mobility Performance in 3GPP Heterogeneous Networks
Yuan Zhou, Zander Lei, Sai Ho Wong, Institute for Infocomm Research

4 WLAN Discovery and Selection for Mobile Data Offloading in Heterogeneous Network
Nguyen Hoai Nam, Takuro Sato, Waseda University

5 An Efficient Synchronization Signal design for Neighboring Cell Search
Xiang Ji, Beijing Institute of Technology; Yuantao Zhang, Zhi Zhang, Nokia (China) Investment Co., Ltd.; Kodo Shu, Nokia Research Center China; Chengwen Xing, Zesong Fei, Beijing Institute of Technology

Wednesday 21 May 10:30-12:00 Studio 4

8D: Coding 2

Chair: Sumei Sun, Institute for Infocomm Research, Singapore

1 Digital Fountain Codes with Reduced Latency, Complexity and Buffer Requirements for Wireless Communications
Rouzbeh Razavi, Bell Labs, Alcatel-Lucent; Holger Claussen, Alcatel-Lucent

2 Trellis Coded Space-Shift Keying Modulation
Gencer Yilmaz, Politecnico di Milano; Ertugrul Basar, Ümit Aygölü, Istanbul Technical University

3 Enhanced Rateless-Code Based Communications Over Long Fat Networks
Rouzbeh Razavi, Bell Labs, Alcatel-Lucent

4 Trellis Coded Generalized Spatial Modulation
You Zhou, Dongfeng Yuan, Xiaotian Zhou, Haixia Zhang, Shandong University

5 Non-Unitary Matrix Based Differential Phase Control Codebook for temporally Correlated Channels
Xun Li, Wei Wang, –Tao Yang, Alcatel Shanghai Bell

Wednesday 21 May 10:30-12:00 Studio 5

8E: Channel Estimation 2

Chair: Chester Sungchung Park, Konkuk University, Korea

1 Phase Noise Estimation for M-QAM Constellations using Gaussian Sum Particle Filtering
Pedro Pedrosa, Instituto de Telecomunicações; Rui Dinis, Universidade Nova de Lisboa; Fernando Nunes, Instituto Superior Técnico; Antonio Rodrigues, Instituto Superior Técnico/IT, Portugal

2 On threshold SNR in estimating the frequency and phase of a noisy single sinusoid
Hua Fu, Pooi-Yuen Kam, National University of Singapore

3 Subspace-based Blind Channel Estimation for MIMO-OFDM Systems with New Signal Permutation Method
Shih-Hao Fang, Industrial Technology Research Institute

4 On Channel Estimation for Multi User-MIMO in LTE-A Uplink
Li Qiang, Wu Yu-chun, Shulan Feng, Yongxing Zhou, Philipp Zhang, Lixia Xue, Huawei Technologies

5 Overall Outage Analysis of Three-Phase Analog Network Coding with Channel Estimation Errors
Suneel Yadav, Prabhat Kumar Upadhyay, Indian Institute of Technology Indore

Wednesday 21 May 10:30-12:00 Studio 8

8F: Transportation Communications 1

Chair: Hyun-seo Oh, ETRI, Korea

1 Performance Evaluation of an Advanced Energy-aware Client-based Handover Solution in Heterogeneous LTE and WiFi Networks
Maike Kuhnert, Christian Wietfeld, TU Dortmund University

2 Interaction between Machine-Type Communication and H2H LTE Traffic in Vehicular Environments
Christoph Ide, TU Dortmund University; Lars Habel, Timo Knaup, Michael Schreckenberg, University Duisburg-Essen; Christian Wietfeld, TU Dortmund University

3 A Power Management Strategy of Hybrid Vehicles Using Traffic Preview Information
Chunhua Zheng, GuoQing Xu, Shenzhen Institutes of Advanced Technology; Suk Won Cha, Seoul National University

4 Architecture and Recipient Selection of Emergency Messaging for Ambulance Traveling
Tzu-Hao Hsu, Sok-Ian (Ines) Sou, Chuan-Sheng Lin, National Cheng Kung University

5 Optimal Duty Cycling and Rate Control For Wireless Sensor and Vehicular Networks
S. A. Arshad, M. A. Murtaza, M Tahir, University of Engineering and Technology Lahore

Wednesday 21 May 10:30-12:00 Studio 9

8G: Relaying

Chair: Jun Heo, Korea Univ, korea

1 Relay Selection for Efficient HARQ-IR Protocols in Relay-Assisted Multisource Multicast Networks
Quoc-Tuan Vien, Huan X. Nguyen, Purav Shah, Middlesex University; Enver Ever, Middle East Technical University Northern Cyprus Campus; Duc To, Aeroflex Limited

2 Practical Limits of Rateless Codes in Multihop Relay Networks
Ashish James, A.S. Madhukumar, Nanyang Technological University

3 On Asymmetric Multi-Way Relaying X Networks: Remapping of Signal Space Alignment for Network Coding
Qing Huang, Beijing University of Posts and Telecommunications; Yingmin Wang, Xiaoming Dai, China Academic of Telecommunication Technology; Guixian Xu, Yuwei Ren, Beijing University of Posts and Telecommunications

4 Transmission Protocol Design for Binary Physical Network Coded Multi-Way Relay Networks
Ronald Y. Chang, Sian-Jheng Lin, Wei-Ho Chung, Academia Sinica

5 A Joint Relaying and Superposition Coding Transmission Scheme for Downlink Networks: Energy Efficiency and Optimization Issues
Sulong Shi, Longxiang Yang, Keith Q. T. Zhang, Hongbo Zhu, Nanjing University of Posts & Telecommunications

Wednesday 21 May 10:30-12:00 Studio 10

8H: Body-Area Networks

Chair: Jeong Woo Lee, Chung-Ang University, korea

1 Implementation and Study of a numerical 60 GHz Indoor Off-Body Channel
Theodoros Mavridis, Luca Petrillo, Université Libre de Bruxelles; Julien Sarrazin, Aziz Benlarbi-Delaï, Sorbonne Université UPMC; Philippe De Doncker, Université Libre de Bruxelles

2 3D UTD Modeling of a Measured Antenna disturbed by a Dielectric Circular Cylinder in WBAN Context
Eric Plouhinec, IETR/CREC St-Cyr; Bernard Uguen, IETR / CNRS / Université Rennes-I; Meriem Mhedhbi, University of Rennes; Stephane Avrillon, University of RENNES1, IETR Lab

3 Ultra WideBand channel characteristics for Body Area Network
Jeongwook Kim, Seoul National University

4 Energy Efficiency Optimization by Resource Allocation in Wireless Body Area Networks
Xiaoli Zhou, Tingting Zhang, Liyuan Song, Zhang Qinyu, Harbin Institute of Technology

5 Wireless Power Transfer Communications for Leg Lengthening/Shortening Procedures
Sum Yee Loon, Soong Boon Hee, Nanyang Technological University, Singapore; Liu Wei, SIMTech, A*STAR; Chen Ming Song, Nanyang Technological University

Wednesday 21 May 13:30-15:00 Studio 1

9A: Propagation Modeling

Chair: Juyul Lee, ETRI, Korea

1 Impact of Modern Construction Materials on Radio Signal Propagation: Practical Measurements and Network Planning Aspects
Ari Asp, Yaroslav Sydorov, Mikko Keskikastari, Mikko Valkama, Janro Niemela, Tampere University of Technology

2 Path-loss and car-body-effect characterization for smart tires communiations at UWB and ISM bands
Saeed Ghamari, Gabriele Tasselli, Ecole Polytechnique Fédérale de Lausanne (EPFL); Guo Yi, EPFL-IMT-ESPLAB; Christian Robert, Cyril Botteron, Pierre-André Farine, Ecole Polytechnique Fédérale de Lausanne (EPFL)

3 Delay Profile Model for Low Antenna Height Base Stations in Broadband Mobile Communication
Teruya Fujii, Yoshichika Ohta, Softbank Mobile Corp.; Hideki Omote, Softbank Telecom; Yosuke Sugita, Softbank Telecom Corp.

4 Elevation Characteristics of Outdoor-to-Indoor Macrocellular Propagation Channels
Rui Wang, Seun Sangodoyin, Andreas F. Molisch, University of Southern California; Charlie Zhang, Samsung; Young Han Nam, Samsung Telecommunications America; Juho Lee, Samsung Electronics

5 A Standardized Path Loss Model for the GSM-Railway based High-Speed Railway Communication Systems
Ruisi He, Zhangdui Zhong, Bo Ai, Jianwen Ding, Wenyi Jiang, Haoxiang Zhang, Beijing Jiaotong University; Xinghan Li, Xian University of Post and Telecommunications

Wednesday 21 May 13:30-15:00 Studio 2

9B: Interference Management and Synchronization

Chair: Petros Spachos, University of Toronto, Canada

1 Distributed Initial Synchronization for 5G small cells
Gilberto Berardinelli, Fernando Tavares, Troels B. Sørensen, Preben E. Mogensen, Aalborg University; Olav Tirkkonen, Aalto University

2 Multi User Inter Cell Interference Alignment in Heterogeneous Cellular Networks
Danish Aziz, Mustansir Mazhar, Alcatel-Lucent Bell Labs; Andreas Weber, Bell Labs, Alcatel-Lucent

3 Interference-Aware Interference Mitigation for Device-to-Device Communications
HyukJoon Kwon, Samsung; Jungwon Lee, Inyup Kang, Samsung US R&D Center

4 Spatial Statistical Modeling for Heterogeneous Cellular Networks -- An Empirical Study
Liang Wu, Yi Zhong, Wenyi Zhang, University of Science and Technology of China

5 MLE for Receiver-to-Receiver Time Synchronization in Wireless Networks with Exponential Distributed Delays
Djamel Djenouri, CERIST Center of Research

Wednesday 21 May 13:30-15:00 Studio 3

9C: Wireless LAN

Chair: Rick Roberts, Intel Labs, USA

1 Association and Deployment Considerations in Dense Wireless LANs
Ali Ozyagci, Ki Won Sung, Jens Zander, Royal Institute of Technology (KTH)

2 Efficient Multi-User Transmission Technique with Frequency Division for WLANs
Shoko Shinohara, B. A. Hirantha Sithira Abeysekera, Yasuhiko Inoue, Yusuke Asai, Masato Mizoguchi, NTT

3 Network-controlled Channel Allocation Scheme for IEEE 802.11 Wireless LANs: Experimental and Simulation Study
B. A. Hirantha Sithira Abeysekera, Koichi Ishihara, Yasuhiko Inoue, Masato Mizoguchi, NTT

4 Exploiting Additional Active Time of WiFi Interface to Reduce Power Consumption of Smartphones
Young Deok Park, Jae-Pil Jeong, Young-Joo Suh, Pohang University of Science and Technology (POSTECH)

5 Wake-up Channel Selection for On-Demand WiFi Wake-up using WLAN Signals
Takeru Yoshiwaka, Hiroyuki Yomo, Kansai University; Tetsuya ITO, NEC Communication Systems

Wednesday 21 May 13:30-15:00 Studio 4

9D: Transportation Communications 2

Chair: Nakjung Choi , Bell Labs Seoul, Korea

1 Optimized Dynamic Multicast Grouping for Content-Based Routing in Vehicular P2P Environments
Smitha Shivshankar, Abbas Jamalipour, University of Sydney

2 A Performance Study of Spatial Modulation Systems under Vehicle-to-Vehicle Channel Models
Yu Fu, Cheng-Xiang Wang, Heriot-Watt University; Raed Mesleh, University of Tabuk; Xiang Cheng, Peking University; Harald Haas, University of Edinburgh; Yejun He, Shenzhen University

3 Cooperative Spectrum Sensing in the Vehicular Environment: An Experimental Evaluation
Haris Kremo, Onur Altintas, Hideaki Tanaka, Toyota InfoTechnology Center; Masayuki Kitamura, Kei Inage, Takeo Fujii, University of Electro-Communications

4 QoE-Aware LTE Radio Link Control Parameters for Voice over IP in Vehicular Environments
Ren-Huang Liou, National Chiao Tung University; Christoph Ide, Bjoern Dusza, Christian Wietfeld, TU Dortmund University; Yi-Bing Lin, National Chiao Tung University

5 V2V Path Loss Modeling for Example 5 GHz Overpass Channels
Pengyu Liu, Bo Ai, Beijing Jiaotong University; David Matolak, Ruoyu Sun, University of South Carolina

Wednesday 21 May 13:30-15:00 Studio 5

9E: MIMO Systems 2

Chair: Seong-Jun Oh, Korea University, Korea

1 Soft-PIC Frequency-Domain Equalization in iterative MIMO Receivers for the LTE-A Uplink
Tobias Seifert, Gerhard Fettweis, Technische Universität Dresden

2 Field Measurements of Uplink MU-MIMO
Liu Jinhua, Guo Zhiheng, Hai Wang, –Fan Rui, Ericsson Research

3 Novel Diversity Estimation for Dynamic MIMO SC-FDE systems with Carrier-Selection
Tsung-Hua Tsai, Industrial Technology Research Institute; Tsan-Ming Wu, Chung Yuan Christian University

4 Investigation on Feedback Channel State Information for Interference Rejection Combining Receiver in LTE-Advanced Downlink
Yousuke Sano, Yusuke Ohwatari, Yuta Sagae, Akihito Morimoto, Yukihiko Okumura, NTT DOCOMO, INC.

5 Link Adaptation Scheme for uplink MIMO transmission with Turbo Receivers
Yun Xue, Qiang Sun, Bin Jiang, Xiqi Gao, Southeast University

Wednesday 21 May 13:30-15:00 Studio 8

9F: Vehicular Networks

Chair: Sejun Song, University of Missouri at Kansas City, USA

1 A Tone-Based Time-Slotted Protocol for Multi-Hop Emergency Message Dissemination in VANETs
Muhammad Awais Javed, University of Newcastle; Jamil Khan, The University of Newcastle, Australia; Duy T. Ngo, University of Newcastle

2 Toward a Totally Distributed Flat Location Service for Vehicular Ad Hoc Networks
Celimuge Wu, Satoshi Ohzahata, The University of Electro-communications; Yusheng Ji, National Institute of Informatics; Toshihiko Kato, The University of Electro-communications

3 Geometric Programming Based Resource Allocation for Mobile Relays on Vehicles
Shaoyi Xu, Tianhang Fu, Beijing Jiaotong University; Kyungsup Kwak, Inha University

4 Vertical Handoff Strategy on Achieving Throughput in Vehicular Heterogeneous Network
Limin Li, Yubin Xu, Lin Ma, Harbin Institute of Technology

5 Energy Efficiency of Cooperative Base Station Sleep Scheduling for Vehicular Networks
Tao Han, HuaZhong University of Science and Technology; Zijie Zhang, University of Sydney; Min Hu, HuaZhong University of Science and Technology; Guoqiang Mao, University of Sydney; Xiaohu Ge, Qiang Li, Lijun Wang, HuaZhong University of Science and Technology

Wednesday 21 May 13:30-15:00 Studio 9

9G: MIMO Systems 3

Chair: Dong Ku Kim, Yonsei University, Korea

1 Distributed Link Clustering for Clustered Cooperative MIMO
Chang Kyung Sung, Andrew Zhang, Zhuo Chen, Iain B. Collings, CSIRO

2 Linear Transceiver Design for MIMO Relay Broadcast Channels with Max-Min Fairness
Edwin Monroy, Seoul National University; Young-Han Kim, University of California, San Diego; Sunghyun Choi, Seoul National University

3 Performance Analysis of Space-Time Block Coded Joint Tx/Rx Diversity Using Optimal Transmit FDE in Presence of Channel Estimation Error
Hiroyuki Miyazaki, Fumiyuki Adachi, Tohoku University

4 A Novel Distributed Scheduling Algorithm for Uplink MU-MIMO Systems
Yinxiang Zhang, Pengxiang Hu, Tao Xiaofeng, Beijing University of Posts and Telecommunications

5 Joint Relay-and-Antenna Selection for Two-Way Decode-and-Forward MIMO Relay Networks
Zhou Jia, Xiaoxiang Wang, Mingming Li, Beijing University of Posts and Telecommunications

Wednesday 21 May 15:30-17:00 Studio 1

10A: Channel Modeling

Chair: Myung-Don Kim, ETRI, Korea

1 On the Performance of Doubly-Selective Fading Estimations in High Mobility Systems
Ning Sun, University of Arkansas; Jingxian Wu, University of Arkansas, USA

2 3D Polarization Projection for WINNER Channel Simulations
Yang Zhang, Xidian University; Lihua Pang, Xi'an University of Science and Technology; Bingbing Li, Jiandong Li, Xidian University

3 Parametric Channel Prediction for Narrowband MIMO Systems Using Polarized Antenna Arrays
Ramoni O. Adeogun, Paul D. Teal, Pawel Dmochowski, Victoria University of Wellington

4 Ricean K-Factor Measurements and Analysis for Wideband Radio Channels in High-Speed Railway U-shape Cutting Scenarios
Tao Zhou, Beijing Jiaotong University; Liu Liu, Beijing Jiaotong University

5 Cluster Characteristics of Wideband 3D MIMO Channels in Outdoor-to-Indoor Scenario at 3.5 GHz
Detao Du, Zhang Jianhua, Chun Pan, Chi Zhang, Beijing University of Posts and Telecommunications

Wednesday 21 May 15:30-17:00 Studio 2

10B: Network Security

Chair: Hyukjoon Kwon, Samsung US R&D Center, USA

1 A Game-Based Incentive Mechanism of Relay Selection for Ad-hoc Network Security
Hong Ying, NDSC; Kaizhi Huang, Information Engineering University

2 Angle-based Dynamic Routing Scheme for Source Location Privacy in Wireless Sensor Networks
Petros Spachos, University of Toronto; Dimitris Toumpakaris, University of Patras; Dimitrios Hatzinakos, University of Toronto

3 Modeling Dynamics of Malware with Incubation Period from the View of Individual
Pin-Yu Chen, University of Michigan; Han-Feng Lin, Ko-Hsuan Hsu, Shin-Ming Cheng, National Taiwan University of Science and Technology

4 Improving Secrecy Outage Probability with Symbol Extension
Cong Zhang, Tiejun Lv, Ruohan Cao, Beijing University of Posts and Telecommunications

5 Security-Reliability Analysis for Cloud Radio Networks with Channel Estimation Error
Jia You, Zhangdui Zhong, Gongpu Wang, Beijing Jiaotong University

Wednesday 21 May 15:30-17:00 Studio 3

10C: Wireless Access in LTE-A and 5G

Chair: Saud Althunibat, University of Trento, Italy

1 Multiple Access and Waveforms for 5G: IDMA and Universal Filtered Multi-Carrier
Yejian Chen, Alcatel-Lucent Bell Labs Germany; Frank Schaich, Thorsten Wild, Bell Labs, Alcatel-Lucent

2 System Performance of an LTE-A Cellular Network with Shared Relays under Different Resource Demands
Tao Tao, University of Duisburg-Essen; Prof. Andreas Czylwik, Universität Duisburg-Essen

3 Energy Efficiency Performance of LTE Dynamic Base Station Downlink DTX Operation
Jung-Fu (Thomas) Cheng, Havish Koorapaty, Pål Frenger, Daniel Larsson, Sorour Falahati, Ericsson

4 Waveform contenders for 5G - suitability for short packet and low latency transmissions
Frank Schaich, Thorsten Wild, Bell Labs, Alcatel-Lucent; Yejian Chen, Alcatel-Lucent Bell Labs Germany

5 Device-to-Device Communication in LTE-A Cellular Networks: Standardization, Architecture, and Challenge
Yong Liu, Yanli Xu, Dong Li, Alcatel-Lucent Shanghai Bell

Wednesday 21 May 15:30-17:00 Studio 4

10D: Applications & Services

Chair: Changhee Joo, UNIST, Korea

1 Cool-SHARE: Offload Smartphone Data By Sharing
Nikki Broch Ashton, Qi Zhang, Aarhus University

2 Model for Mapping between the Quality of Service and Experience for Wireless Multimedia Applications
Daniel Robalo, Instituto de Telecomunicações-DEM Universidade da Beira Interior; Fernando J Velez, IT-DEM, University of Beira Interior

3 A Framkework for Streaming Service Composition
Zhitao Wan, Ping Wang, Peking University

4 An Effective Algorithm for Interest Aware Opportunistic Advertising by Mining Social and Consuming Information
Chia-Yu Lin, National Chiao Tung University; Zhi-Feng Jiang, Industrial Technology Research Institute; Li-Chun Wang, National Chiao Tung University

5 A Novel Recovery Strategy for Service Interruption in Ubiquitous Stub Environment
Danmei Niu, Lanlan Rui, Shaoyong Guo, Qiu Xue-song, Beijing University of Posts and Telecommunications

Wednesday 21 May 15:30-17:00 Studio 5

10E: Interference Management 5

Chair: Jeong-Ho Kim, Ewha Womans University, Korea

1 Adaptive Sliding Window Minimum Mean Square Error Inter-Carrier Interference Cancellation
Rana Ahmed, University of Stuttgart; Nabil Sven Loghin, European Technology Center Sony Stuttgart; Joachim Speidel, University of Stuttgart

2 Out-of-Band Interference Reduction Using Subcarrier Weighting and Cancellation Carriers
Ahmed Selim, Linda Doyle, University of Dublin, Trinity College

3 Interference-Aware Interference Cancellation using Soft Feedback via Network Assistance
HyukJoon Kwon, Samsung; Jungwon Lee, Inyup Kang, Samsung US R&D Center

4 Iterative Interference Modulation Classification
Yoojin Choi, Samsung US R&D Center; Dongwoon Bai, Samsung Mobile Solutions Lab; Jungwon Lee, Samsung US R&D Center; Inyup Kang, Samsung

5 An Efficient Phase based Imperfect Interference Alignment Scheme for 3-user Asymmetric Constant Channel
Long Suo, Hongyan Li, Xidian University; Miao Pan, Texas Southern University; Jiandong Li, Xidian University

Wednesday 21 May 15:30-17:00 Studio 8

10F: Vehicular Technologies

Chair: Seong-dong Kim, KETI, Korea

1 A Use of Cellular Network records to sense the impact of urban transit systems comfort on users route choices
Chloe Milion, Sylvain Allio, Orange Labs; Vincent Aguilera, Univesité Paris Est

2 Time-Gap Based Traffic Model for Vehicular Traffic Flow
Seokheon Cho, Rene Cruz, Ramesh Rao, University of California, San Diego; Anush Badii, Caltrans

3 WiFiHonk: Smartphone based Beacon Stuffed WiFi Car2X-Communication System for Vulnerable Road User Safety
Kaustubh Dhondge, Sejun Song, Baek-Young Choi, Hyungbae Park, University of Missouri - Kansas City

4 Bloom Filter for Fixed-Size Beacon in VANET
Kulit Na Nakorn, Chulalongkorn University; Yusheng Ji, National Institute of Informatics; Kultida Rojviboonchai, Chulalongkorn University

5 An Analytic Hierarchy Process Based Approach for Optimal Road Side Unit Placement in Vehicular Ad Hoc Networks
Moumita Patra, Sudeepta Mishra, C. Siva Ram Murthy, Indian Institute of Technology Madras

Wednesday 21 May 15:30-17:00 Studio 9

10G: Two-way Relaying

Chair: Tae-Won Ban, Gyeongsang National University, Korea

1 Performance Analysis for Decode-and-Forward Two-way Relay Networks with Limited Feedback Beamforming
Zhoujia, Xiaoxiang Wang, Mingming Li, Beijing University of Posts and Telecommunications

2 Distributed Space-Time Coding for Two-way Relay Networks
Mostafa Raeisi, S. Mohammad Razavizadeh, Iran University of Science & Technology (IUST); Inkyu Lee, Korea University

3 Two-Way AF Wireless Relay Networks under Channel Uncertainty
Kanghee Lee, Hyuck M. Kwon, Jie Yang, Edwin Sawan, Wichita State University; Hyuncheol Park, Korea Advanced Institute of Science and Technology

4 On the Outage Probability of Cognitive Two-Way Relaying Based on Superposition Coding
Yong Li, Tingting Wang, Mugen Peng,; Wenbo Wang, Beijing University of Posts & Telecommunications

5 Sum Rate Balancing for OFDM-Based Cognitive Two-Way Relaying
Tingting Wang, Yong Li, Mugen Peng, Wenbo Wang, Beijing University of Posts & Telecommunications

Wednesday 21 May 15:30-17:00 Studio 10

10H: Visible Light Communications for Vehicular Networks (VLCVN 2014)

Chair: Navin Kumar, Bangalore, India

1 New, Effective and Efficient Dimming and Modulation Technique for Visible Light Communication
Navin Kumar, Amrita Vishwa Vidyapeetham, Bangalore; Anand M, Centre for Development of Telematics (C-DOT)

2 SNR Analyses of the Multi-spectral Light Channels for Optical Wireless LED Communications in Intelligent Transportation System
SungYoon Jung, Ji Hwan Lee, Yeungnam University

3 Vehicular Visible Light Communications with LED Taillight and Rolling Shutter Camera
Peng Ji, University of Tongji; Hsin-Mu Tsai, National Taiwan University; Chao Wang, Fuqiang Liu, University of Tongji

4 Automotive Comphotogrammetry
Richard Roberts, Intel

IEEE VTC Workshop on Emerging Technologies: Wireless Power

Sunday 18 May 08:30-12:00 Park Ballroom 1

Plenary on Wireless Power

1. Research on Wireless Power Transfer Systems at University of Michigan-Dearborn
Chris Mi, University of Michigan-Dearborn

2. The development of Inductive Power Transfer at the University of Auckland
John Boys, Auckland University

3. The development of Shaped Magnetic Field in Resonance Systems for EVs and Trains
Dong Ho Cho, KAIST

10:00-10:30 Coffee Break

4. Interoperable solution for wireless EV charging
Grzegorz Ombach, Qualcomm

5. Wireless Power Transfer: From Directional Power to Omni-directional Power
S. Y. Ron Hui, University of Hong Kong

6. High Power Wireless Charging Systems for EV's
John M. Miller, Oak Ridge National Laboratory

Sunday 18 May 13:30-16:30 Park Ballroom 1

Oral Papers

1. A High-Frequency Resonant Converter Based on the Class PHI2 Inverter for Wireless Power Transfer
Jungwon Choi, Wei Liang, Luke Raymond, and Juan Rivas

2. A Novel Source-side Monitored Capacitive Power Transfer System for Contactless Mobile Charger using Class-E Converter
Bohwan Choi, Duy Nguyen Tan, Jihoon Kim, and Chun T. Rim

3. Analysis and Research of Distance Transmission Characteristics of Magnetic Resonance WPT System
Chen Wenxian and Chen Qianhong

4. Influences of Spurious Conductors on Long Distance Inductive Power Transfer Systems
Jeong Seog Yong and Chun T. Rim

5. Steady-State Analysis of Series/Series-Parallel Compensated Contactless Resonant Converter
Jia Hou, Qianhong Chen, Xiaoyong Ren, S. C. Wong, and Chi K. Tse

6. The Parameter Design of the Wireless Power Electric Vehicle
Young Dae Ko and Young Jae Jang

7. Trends of Wireless Power Transfer Systems for Roadway Powered Electric Vehicles
Suyong Choi, Beomwoo Gu, Jeong Seog Yong, and Chun T. Rim

The Second International Workshop on Vehicular Traffic Management for Smart Cities

8:50-9:00 Welcome Address

Sunday 18 May 9:00-10:00 Park Ballroom 2

Keynote: Geo-localized Vehicular Networking: research challenges and recent achievements

Yacine Ghamri-Doudane, University of La Rochelle, France

It had been about a decade since Inter-Vehicle Communication (IVC) is attracting considerable attention from the research community and the automotive industry. It is the cornerstone in building modern Intelligent Transportation Systems (ITS) as well as in providing a whole new set of assistance services for drivers and passengers. In this context, Vehicular Networks emerged as a novel category of wireless networks, spontaneously formed between moving vehicles equipped with wireless interfaces that could have similar or different radio interface technologies, employing short-range to medium-range communication systems. The distinguished characteristics of vehicular networks such as high mobility, potentially large scale, and network partitioning introduce several challenges, which can greatly impact the future deployment of these networks. In this Keynote, we focus on discussing recent achievements in Vehicular Networking with an emphasis in Geo-localized communications; some of their research challenges and the corresponding proposed solutions.

10:00-10:20 Coffee Break

Sunday 18 May 10:20-12:20 Park Ballroom 2

WSNs and VANETs Applications for Smart Cities

Chair: Soufiene Djahel, University College Dublin, Ireland

1. **Analysis of Energy Usage in Adaptive Sensor Networks**
   Pradhumna Lal Shrestha, Michael Hempel, Sushanta Mohan Rakshit, Yi, Hamid Sharif, University of Nebraska – Lincoln
2. **Cyclic Prefixed Single Carrier Transmission in Intra-Vehicle Wireless Sensor Networked Control Systems**
   Jin Yongnu, Inha University; Daehan Kwak, Rutgers University; Kyeong Jin Kim, Samsung; Kyung Sup Kwak, Inha University
3. **ReViV: Selective Rebroadcast Mechanism for Video Streaming over VANET**
   Abbas Bradai, Toufik Ahmed, University of Bordeaux I
4. **Using VANET for Critical Infrastructure Situational Awareness in Smart Cities**
   Alexander Keller, Titus Okathe, Roozbeh Jalali, Bryan Pham, Khalil El-Khatib, Richard Pazzi, Stephen Marsh, Shahram Shah Heydari, University of Ontario Institute of Technology; Timothy Storer, University of Glasgow

12:20-14:00 Lunch Break

Sunday 18 May 14:00-15:00 Park Ballroom 2

Keynote: Vehicular Communications: From 1st Generation to Next Generation(s)

Onur Altintas, Toyota InfoTechnology Center, Japan

Vehicular communications have the potential to enhance the driving experience, especially with respect to increasing driver awareness and situation perception to ensure overall traffic safety. In this keynote, we will look into applications and use cases of vehicular networking followed by an overview of the standardization activities. We will briefly cover the requirements of applications with a system level comparison of V2V, V2R and V2I, followed by a description of international deployment plans and field tests. Before concluding, we will take a glimpse at the recent research results on using TV white space for V2V communications. Recently emerging reality of electric vehicles and autonomous vehicles along with the issues surrounding them as well as the open issues that require further research will conclude the talk.

15:00-15:20 Coffee Break

Sunday 18 May 15:20-17:20 Park Ballroom 2

TMS Services and Applications

Chair: Ulrich Dangel, University College Dublin, Ireland

1. **Micro Analysis of Urban Vehicular Data for Enhanced Information Services for Commuters**
   Ulrich Dangel, University College Dublin; Patrick McDonagh, Dublin City University; Liam Murphy, University College Dublin
2. **Design of a Platoon Management Strategy and its Hardware-In-the Loop validation**
   Antonio Saverio Valente, University of Naples Federico II; Umberto Montanaro, Mediamotive srl; Manuela Tufo, University of Sannio in Benevento; Alessandro Salvi, Stefania Santini, University of Naples Federico II
3. **Equilibrium analysis in the parking search game with heuristic strategies**
   Evangelia Kokolaki, Ioannis Stavrakakis, University of Athens
4. **Risk maps generation for road accidents - The application architecture and functionality**
   German Bravo, University of Los Andes

17:20-17:25 Closing

The 2nd International Workshop on 5G Mobile and Wireless Communication System for 2020 and Beyond (MWC2020)

Sunday 18 May 08:30-10:00 Park Ballroom 3

Plenary Session

Greeting from Workshop Chairs

Youngnam Han, KAIST, SC Chair of 5G Forum, Korea

Dongku Kim, Yonsei University, SC Vice-Chair of 5G Forum, Korea

5G Forum VIew on 5G Mobile Communications

Seungchan Bang, 5G Forum Technology Subcommittee Chair / Electronics and Telecommunications Research Institute (ETRI), Korea

Towards the METIS 5G Concept

Hugo Tullberg, METIS Technical Manager / Ericsson, Sweden

5G Development in Europe

Bernard Barani, Deputy Head of Unit, DG CONNECT, European Commission

Creative 5G Mobile Strategy in Korea

Sang Kug Lee, Deputy Director, Information & Communications Technology Policy Division, Ministry of Science, ICT and Future Planning, Korea

10:00-10:20 Coffee Break

Sunday 18 May 10:20-11:20 Park Ballroom 3

Invited Talk Session

1. **mmWave based Cellular Mobile Communications: Recent Research Results from the Giga Korea Project**
   JunHwan Lee, YoungJo Ko, SeungChan Bang, Electronics and Telecommunications Research Institute (ETRI), Korea
2. **Bending the Boundaries: METIS Research towards a Flexible 5G PHY**
   Ömer Bulakci, Huawei Research Center
3. **SmallCell Technology for the 5-th Generation Wireless Communication Systems**
   Ju Yong Lee, Il-Do Choi, Kyoungtae Lee, Gye-Tae Gil, Dong Ho Cho, Korea Advanced Institute of Science and Technology

Sunday 18 May 11:20-12.05 Park Ballroom 3

Poster Teaser Session

1. **Achievable Performance Gains Using Movement Prediction and Advanced 3D System Modeling**
   Andreas Klein, Alexander Rauch, Raja Rajesh Sattiraju, Hans Schotten, University of Kaiserslautern
2. **Advanced Femto-Caching File Placement Technique for Overlapped Helper Coverage**
   Jae-Nam Shim, Byoung-Yoon Min, Kiyeon Kim, Jin Young Jang, Dongku Kim, Yonsei University
3. **Energy-efficient Channel Reusing for Device-to-Device Communications Underlying Cellular Networks**
   Chong Yin, Ying Wang, Wenxuan Lin, Xun Wang, Beijing University of Posts and Telecommunications
4. **A QoS-aware Adaptive Access Point Sleeping in Relay-Based Cellular Networks for Energy Efficiency**
   Yutao Zhu, Zhimin Zeng, Tiankui Zhang, Beijing University of Posts and Telecommunications; Dantong Liu, Queen Mary University of London
5. **Design of Two Way Relay Network Using Space-Time Block Coded Network Coding and Linear Detection**
   Duc Hiep Vu, Le Quy Don Technical University; Pham Van Bien, Nanjing Univ. of Sci. & Technol; Xuan Nam Tran, Le Quy Don Technical University
6. **Joint Relay Selection and Spectrum Allocation Scheme in Cooperative Relay Networks**
   Tiankui Zhang, Jinlong Cao, Zhimin Zeng, Beijing University of Posts and Telecommunications; Dantong Liu, Queen Mary University of London
7. **Performance Evaluation for Energy-Harvesting Machine-Type Communication in LTE-A System**
   Mei-Ju Shih, Yuan-Chi Pang, Guan-Yu Lin, Hung-Yu Wei, National Taiwan University; Rath Vannithamby, Intel Co.
8. **A Novel Component Carrier Selection and Collision Avoidance Scheme in Femtocell Networks**
   Weitao Ge, Qing Huang, Beijing Jiaotong University; Li Zhao, Microsoft Corporation
9. **Reliability Modeling, Analysis and Prediction of Wireless Mobile Communications**
   Raja Rajesh Sattiraju, Hans Schotten, University of Kaiserslautern

12:05-13:10 Lunch Break

Sunday 18 May 13:10-14:30 Park Ballroom 3

Paper Session

1. **Centimeter-Wave Concept for 5G Ultra-Dense Small Cells**
   Preben E. Mogensen, Nokia Networks; Kari Pajukoski, Esa Tiirola, Jaakko Vihriälä, Eeva Lähetkangas, Nokia Siemens Networks; Gilberto Berardinelli, Fernando Tavares, Nurul Huda Mahmood, Mads Lauridsen, Davide Catania, Andrea Fabio Cattoni, Aalborg University
2. **New Spectrally and Energy Efficient Flexible TDD Based Air Interface for 5G Small Cells**
   Toni Levanen, Jukka Talvitie, Tampere University of Technology; Juho Pirskanen, Broadcom Corporated; Mikko Valkama, Tampere University of Technology
3. **Dynamic Context-aware Optimization of D2D Communications**
   Lianghai Ji, Andreas Klein, Hans Schotten, Rajesh Sattiraju, Nandish P. Kuruvatti, University of Kaiserslautern
4. **Dynamic Fractional Frequency Reuse Method for Self-Organizing Smallcell Network**
   Daniel H. Chae, The Australian National University; Nicholas H. Kim, Juni-global Australia Pty Ltd.; Yibeltal F. Alem, Salman Durrani, Rodney A. Kennedy, The Australian National University

14:30-15:20 Poster Presentation & Coffee Break

Sunday 18 May 15:20-16:40 Park Ballroom 3

Industry Talk Session

5G Key Enabling Technologies for Gbps Anywhere with Recent R&D Results
Wonil Roh, Samsung Electronics, Korea

5G: Revolutionary or Evolutional?
Chih-Lin I, China Mobile, China

Wireless Challenges for the 5G definition
Takehiro Nakamura, NTT DOCOMO, Japan

Disruptive Evolution of Smart Devices in 5G Era
Minseok Oh, LG Electronics, Korea

16:40-16:50 Break

Sunday 18 May 16:50-18:00 Park Ballroom 3

Panel: Technologies for 5G: Trends and Candidates

Moderator: Youngnam Han, KAIST, SC Chair of 5G Forum, Korea

Panelists:

Bernard Barani, DG CONNECT, European Commission

Wonil Roh, Samsung Electronics, Korea

Chih-Lin I, China Mobile, China

Takehiro Nakamura, NTT DOCOMO, Japan

Minseok Oh, LG Electronics, Korea