VTC2015-Spring
GLASGOW
Innovating a Connected World

Final Program

2015 IEEE 81st Vehicular Technology Conference • 11–14 May 2015 • Glasgow, Scotland UK

IEEE
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Connecting the Mobile World

VTC2016-Spring
NANJING
Green City and Wireless Future
15—18 May 2016

The 2016 IEEE 83rd Vehicular Technology Conference will be held in Nanjing, China, 15–18 May 2016. Over the past six decades, VTC has established itself as one of the premier conferences in the world on mobile communications and vehicular technology. As the first ever VTC to be held in mainland China, VTC 2016-Spring will feature world-class technical sessions, workshops, and tutorials in, but not limited to, the following technical tracks:

Antenna Systems, Propagation, and RF Design
Signal Transmission and Reception
Cognitive Radio and Spectrum Management
Multiple Antenna Systems and Cooperative Communications
LTE, 5G, and Wireless Heterogeneous Networks
Green Communications and Networks
Ad-Hoc, M2M, and Sensor Networks
Wireless Networks: Protocols, Security and Services
Mobile Satellite Systems, Positioning and Navigation
Vehicular Communications, Networks, and Telematics
Future Trends and Emerging Technologies in Wireless Communications and Networks
Electric Vehicles, Vehicular Electronics, and Intelligent Transportation

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20 September 2015

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20 December 2015

Camera ready papers due
21 February 2016

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The 81st IEEE
Vehicular Technology Conference

Final Programme

11 – 14 May 2015

Glasgow, Scotland

Welcome from the General Co-chairs

On behalf of the Organizing Committee, we would like to welcome you to Scotland and to IEEE VTC2015-Spring. Scotland is home to some of the most important inventors in electrical engineering - Baird, Bell and Maxwell - and some that had a profound impact in telecommunications and transportation.

VTC2015-Spring will be one of the first conferences to be hosted in the new Technology Innovation Centre at the University of Strathclyde, a $150m investment from the Scottish Government to provide linkages between industry and academia. To this we have added expertise on mobile and vehicles from the UK and European research community to host a vibrant conference on all aspects of mobile radio and vehicular technology.

An event such as VTC cannot take place without the dedicated efforts of a very large number of staff and volunteers. We have been very fortunate in the support of colleagues from across Scotland and the rest of the UK and Europe. We would like to thank our friends on the VTC Organising Committee and VTS Conference Committee, as well as the VTS and IEEE conference and publications staff. TPC Co-chairs Mark Beach and Narcis Cardona have done a great job to produce a technical program of the highest quality, supported by excellent work from Publicity Co-chairs Baldomero Coll-Perales and Swee Keow Goo, Speakers Chair Lajos Hanzo, Tutorials Chair Dave Laurenson, and Panel Co-chairs Oscar Lazaro and Robert Atkinson. David Harle, Grieg Paul and Laura Hyslop have all been burning the midnight oil to ensure you all have a great time at the conference. Workshops Co-chairs Klaus Moessner and Cheng-Xiang Wang have organised the largest workshops program VTC has ever seen. Finally we would like to thank you all for coming – without your papers and your discourse, VTC would not be the friendly conference it has become over the past 65 years.

Glasgow is the largest city in Scotland. We hope you'll find some time to explore the history of Glasgow, or visit its parks and museums, which are amongst the best in Europe. Glasgow is also well connected to the rest of the country, so you will have the opportunity to see the rest of Scotland - the lochs and mountains, the golf, and the distilleries.

However, as the saying goes, People Make Glasgow, and we look forward to giving you a great Scottish welcome - both social and liquid!

We hope you will have a successful meeting and enjoy Glasgow and Scotland!

James Irvine and Javier Gozálvez
General Co-chairs, IEEE VTC2015-Spring

Welcome from the TPC Co-chairs

On behalf of the technical program committee, we warmly welcome all participants to the 81st IEEE Vehicular Technology Conference in Glasgow, the largest city in Scotland and the fourth largest in the United Kingdom.

The committee has organized an impressive program on research trends and advances on mobile communication and vehicular technologies as we enter the 5th Generation of wireless connectivity. The conference theme is 'Innovating a Connected World' and the conference is organized around 12 main technical tracks covering many exciting aspects related to the theme.

The technical program consists of 66 oral sessions and 9 poster sessions. The technical program committee have selected a total of 339 papers from the regular call from 732 submissions. The recent results call attracted a further 178 submissions, from which 82 papers have been selected. All accepted papers will be published in the conference proceedings. In addition to the regular oral and poster sessions, the conference hosts 14 workshops, 7 specialist tutorials, 2 industry sessions, 5 keynotes and 4 panel sessions addressing some of the most challenging and though-provoking aspects of wireless communications and vehicular technology.
The creation of this impressive program would not be possible without the constant support from an outstanding team of colleagues that we would like to thank warmly. Special thanks go to the conference track chairs that organized a very efficient and smooth reviewing process, as well as the workshops, panels and tutorial chairs that organized very exciting sessions.
We would also like to thank all the TPC members and reviewers for their professional and timely review of technical contributions. We are also very grateful to the outstanding support from Dr James Irvine in the technical program preparation process.
Of course, making a successful technical conference would not have been possible without the participation from authors, to whom we would like to express our gratitude for having decided to present and share their ideas and contributions to our community.

We would also like to thank all members of the IEEE VTC2015-Spring organization committee for their support during all phases of the technical program development.

We look forward to meeting you in Glasgow, Scotland, this May.

Narcis Cardona and Mark Beach,
TPC Co-chairs, IEEE VTC2015-Spring

Welcome from the VTS President

On behalf of the IEEE Vehicular Technology Society, it gives me great pleasure to welcome you to the IEEE 81st Vehicular Technology Conference in Glasgow.

Continuing a 60-year tradition, this edition of VTC will again be the place to be for four days of technical and scientific exchanges for researchers whose job is to connect the mobile world, to paraphrase our society's tagline. Several hundred specialists from academia, government, and industry will gather in Glasgow to discuss the latest in wireless, mobile, and vehicular technology.

Putting together such a large conference is not a small feat, and I would like to recognize the tremendous work of our general co-chairs, James Irvine and Javier Gozalvez, in making all the pieces of the puzzle fit together over the last few years. Technical Program Committee co-chairs Mark Beach and Narcis Cardona have put together a program that will guide you through the latest scientific advances in the core technologies of interest of VTS, but will also bring to the forefront emerging areas of application through 14 workshops.

I am certain that several of you are, as I am, looking forward to their time in Glasgow. You will be able to judge for yourself its reputation for hospitality (it was recently voted the "friendliest city in the world") through a conference social program that will without a doubt create long lasting memories, and will among other highlights feature a real Scottish Ceilidh!

Finally, in this edition, in addition to our usual program, all VTS members will be invited to meet the members of the VTS Board of Governors during a special reception, to ask questions, give input on society directions, and comment on the state of the society. If you are a member of VTS, do not hesitate to join us for this event, we will definitely enjoy hearing your feedback!

I hope that your overall experience at VTC Glasgow will be an enjoyable one, and that we will be able to meet in person during the event.

Fabrice Labeau, *President*
IEEE Vehicular Technology Society

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Li Zhu
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Jun Zuo

Registration

Registration will take place in the Level 2 lobby. Opening times are:

- Monday 11 May 2015 07:30 - 17:30*
- Tuesday 12 May 2015 07:30 - 17:30
- Wednesday 13 May 2015 07:30 – 17:30
- Thursday 14 May 2015 07:30 – 15:30

* After 18:00 on Monday, you may pick up your badge and tickets at the City Chambers reception – bags can be picked up on Tuesday. (**Your registration receipt is required to pick up your registration at the reception.**)

Breaks

Coffee breaks will take place in the Level 3 foyer. Addition coffee stations are available Tuesday-Thursday on Level 2 and in the café.

Social Events

Lunches are included as part of the full registration and will be served on Levels 2 and 3 (see map). The reception will be conducted on Monday evening, beginning with a drinks reception at the Glasgow City Chambers (see map), followed by light dinner and ceilidh dancing at the University of Strathclyde Student Union (see map). A ticket is required for entry at the City Chambers and ceilidh.

The banquet on the evening of Tuesday 12 May 2015 will be at Kelvingrove Museum and Art Gallery. Hired coaches will leave from the TIC at 18:15 and will pick up from Kelvingrove at 22:00. The evening will begin with a private viewing of the museum, following by dinner in the Centre Hall, and finishing with a short concert by the University of Strathclyde Jazz Orchestra. **At the end of the evening, each coach will drop off at different local hotels so be sure to get on the bus that goes to your hotel.**

Lunches, the reception and banquet require admission tickets and these are included in your registration packet to gain entry. Be sure to present the correct day's lunch ticket or you will not be served. You also may purchase tickets for these events at the registration desk. Workshop attendees with a lunch ticket for Tuesday may use it Monday instead in the café for a two course meal and drink of their choice – only a **Tuesday** lunch ticket will be accepted on Monday. You may also purchase food on Monday in the café – on other days it will be closed to serve the VTC lunch.

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Plenaries

Tuesday 12 May 2015, 8:30–9:30 (Main Auditorium)

Formal Opening and Welcome

Humza Yousaf, *Minister for Europe and International Development, Scottish Government*
Tariq Durrani, OBE, *Honorary Chair, IEEE VTC2015-Spring*

Tuesday 12 May 2015, 9:30–10:30 (Main Auditorium)

5G: The Nervous System of the Digital Society and Digital Economy

David Soldani, *VP of European Research Centre, Huawei*

This keynote introduces the main ICT challenges and opportunities in EU, 5G vision and main research and innovation initiatives ongoing globally. It will then describe Huawei's multitenant network and services vision and the most important 5G enabling technologies, leveraging Software Defined Networking (SDN), Network Functions Virtualization (NFV) and Mobile Edge Computing (MEC). Special attention will be paid on 5G as the nervous system of the Silver Economy, looking at a better age friendly environment (housing), which can help people live longer independently and thus reduce costs of long term care. The Silver Economy is defined as the economic opportunities arising from the public and consumer expenditures related to population ageing and specific needs of the people over 50. This is estimated to be a business at $7 trillion per year, which makes it the 3rd largest economy in the world. By 2020 the private spending power of the elderly generation will reach $15 trillion globally. As for public spending, in the EU, it is projected to grow by more than 4% of GDP until 2060. In this context, 5G will be an integral part of the overall solution to the ambient (housing) assisted living concept, where service robots, mobiles, holographic rendering, cars, etc. could be connected using 5G communication technologies. Conclusions are drawn on the main standardization activities and roadmap towards the IMT for 2020 and beyond.

David Soldani received a M.Sc. degree with maximum score and "cum laude approbatur" in Electronic Engineering from the University of Florence, Italy, in 1994; and a D.Sc. degree in technology with distinction from Aalto University, Finland, in 2006. In 2014, he was appointed Visiting Professor at the University of Surrey, UK. He is one of the top experts in multi-disciplinary, transformative frontier research. He has been active in the ICT field for more than 20 years, successfully working on 150+ R&D projects for 2-5G and contributing to 100+ quality deliverables: from strategic research and innovation to modeling, simulations, emulations and innovative proof of concepts with stakeholders. Dr. Soldani is currently Vice President (VP) of Huawei European Research Centre (ERC) and Head of Central Research Institute (CRI) in Europe. Areas of his responsibility and expertise include, but not limited to: Future Wireless, Network, IoT and Multimedia Technologies. Dr. Soldani represents Huawei in the Board of the 5G Infrastructure Association, in Brussels, and Steering Board (SB) of NetWorld2020 European Technology Platform (ETP), in Europe.

Wednesday 13 May 2015, 9:00–9:45 (Main Auditorium)

5G Mobile Communications - Key Enabling Technologies and Recent R&D Results

Wonil Roh, *Vice President and Head, Advanced Comms Lab, DMC R&D Center, Samsung Electronics*

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. Wonil Roh is currently a Vice President and Head of Advanced Communications Lab at Samsung Electronics Corp in Korea, responsible for research of next generation mobile communications technologies. He started working at Samsung Electronics in 2003 in research and development of CDMA and Mobile WiMAX base-stations with the main focus on multi-antenna algorithms and system analysis. Then he led overall WiMAX standard activities and strategy in Samsung including IEEE, the WiMAX Forum and ITU-R, and served as Chair of Technical Working Group (TWG) of the WiMAX Forum from 2006 to 2011. Since 2011, he has been leading research efforts for the next generation cellular (Beyond 4G or 5G) technologies at DMC R&D Center with a focus on development of disruptive technologies and feasibility studies. Dr. Roh holds a Doctorate in Electrical Engineering from Stanford University, USA..

Wednesday 13 May 2015, 9:45–10:00 (Main Auditorium)

Visual Communication

Thomas Wiegand, *Fraunhofer Heinrich Hertz Institute*

The next generation of video applications will cover large areas of our lives. Starting from the known media applications, digital video will find its way into the traffic, medical and industrial areas posing new

challenges. One such new requirement is ultra low delay video as part of the Tactile Internet for augmented reality applications in cars or head-mounted displays. Here, a strong interaction between the video codecs and the network architecture is necessary. The talk will provide an overview of the challenges of future visual communication.

Thomas Wiegand is a professor in the department of Electrical Engineering and Computer Science of the Technical University of Berlin, chairing the Image Communication Laboratory, and is jointly heading the Fraunhofer Heinrich Hertz Institute, Berlin, Germany.

He received the Dipl.-Ing. degree in Electrical Engineering from the Technical University of Hamburg-Harburg, Germany, in 1995 and the Dr.-Ing. degree from the University of Erlangen-Nuremberg, Germany, in 2000. He joined the Heinrich Hertz Institute in 2000 as the head of the Image Communication group. From 2008-13, he was jointly heading HHI's Image Processing department. His research interests include video processing and coding, multimedia transmission, as well as computer vision and graphics.

From 1993 to 1994, he was a Visiting Researcher at Kobe University, Japan. In 1995, he was a Visiting Scholar at the University of California at Santa Barbara, USA. From 1997 to 1998, he was a Visiting Researcher at Stanford University, USA and served as a consultant to 8x8, Inc., Santa Clara, CA, USA. From 2006-2008, he was a consultant to Stream Processors, Inc., Sunnyvale, CA, USA. From 2007-2009, he was a consultant to Skyfire, Inc., Mountain View, CA, USA. Since 2006, he has been a member of the technical advisory board of Vidyo, Inc., Hackensack, NJ, USA. From 2011-2012, he was a visiting professor at Stanford University, USA.

Since 1995, he has been an active participant in standardization for multimedia with successful submissions to ITU-T VCEG, ISO/IEC MPEG, 3GPP, DVB, and IETF. In October 2000, he was appointed as the Associated Rapporteur of ITU-T VCEG. In December 2001, he was appointed as the Associated Rapporteur / Co-Chair of the JVT. In February 2002, he was appointed as the Editor of the H.264/MPEG-AVC video coding standard and its extensions (FREext and SVC). From 2005-2009, he was Co-Chair of MPEG Video.

Thursday 14 May 2015, 8:30–9:15 (Main Auditorium BC)

Enabling Automotive IoT

Andy Birnie, *Freescale*

Automotive is already the 2nd largest generator of data on the Internet of Things. The use cases are endless & imaginative, but this presentation will explore the challenges that the Automotive IoT presents to the Automotive OEMs, Tier1s and semiconductor vendors. The subjects of connectivity, security and functional safety will be covered along with a brief look at how to make an autonomous car!

After graduating from the University of Glasgow, **Andy Birnie** had various roles in product & technology development, but is currently Systems Engineering Manager for Automotive Microcontroller within Freescale. In this role Andy is responsible for working with Tier1s and OEMs to understand market trends and customer demands, to define the next generation of microcontrollers, keeping Freescale at the forefront of automotive electronics systems technology for the next 10 years. Andy sits on the OPEN Alliance steering group, pushing adoption of Ethernet into automotive, and was a founder member of the AESIN (Automotive Electronic Systems Innovation Network) consortium in the UK.

Thursday 14 May 2015, 9:15–10:00 (Main Auditorium BC)

Wireless Communications for Vehicle Safety and Automated Driving

Luca Delgrossi, *Director Autonomous Driving U.S., Mercedes-Benz Research & Development North America Inc.*

Wireless communications are destined to play a central role in the future of the automobile and will change the way we look at transportation systems. Extensive research conducted over the last decade shows how unprecedented levels of safety on the roads can be reached by developing systems where vehicles, other road users, and roadside infrastructure cooperate together. Moreover, it is expected that wireless communications will provide a key foundation to support the deployment of automated cars, perhaps the most fascinating and challenging trend in the automotive industry. In this talk, the speaker will recall his experience with building connected as well as automated vehicles and highlight results, achievements, and open challenges. The talk will address a number of ideas and solutions based on different wireless communications technology and present several state-of-the-art prototype systems built to test and prove them.

Dr. Luca Delgrossi is Director Autonomous Driving U.S. at Mercedes-Benz Research & Development North America Inc. A pioneer in vehicular communications, he coordinated the team that developed the first 5.9 GHz Dedicated Short Range Communications radio and On-Board Equipment. At the 15th ITS World Congress in New York, in 2008, his team showcased a Mercedes-Benz S550 engaging automated braking upon the detection of an imminent red light violation. More recently, his team designed and built nine Mercedes-Benz C300 and four Freightliner Cascadia trucks for the USDOT V2V Safety Pilot Model Deployment field trial. Currently, he is the lead of a competence center focusing on digital maps for highly automated driving as well as connected vehicles solutions.

Dr. Delgrossi holds a PhD in Computer Science. He has conducted research at the University of California at Berkeley, Internet Engineering Task Force, IBM European Networking Center in Heidelberg, Germany, and Catholic University of Milan, Italy. Currently, Dr. Delgrossi represents Mercedes-Benz at the Crash Avoidance Metrics Partnership (CAMP) and serves as Chairman of the Board of Directors at the Vehicle Infrastructure Integration Consortium (VIIC).

He is the author of over 70 publications in scientific journals and conferences and is Co-Editor of the IEEE Communication Magazine Automotive Series. With Dr. Tao Zhang, he authored the book "Vehicle Safety Communications: Protocols, Security, and Privacy", published by Wiley in 2012.

Panels

Tuesday 12 May 2015, 11:00–12:30 (Level 1 Auditorium)

mmWave Technology for Telecommunications: Scope, Status & Way Forward in Pre-development & Standards

Moderator:	**Valerio Frascolla**	*Intel*
Panelists:	**Laurent Dussopt**	*CEA-Leti*
	Zhinong Ying	*Sony Mobile*
	Mark Beach	*Bristol University*
	André Bourdoux	*IMEC*
	Maziar Nekovee	*Samsung*
	Federico Boccardi	*Ofcom*

Radio frequency bands in the range ~30-300GHz and the technologies needed to make use of them are broadly recognized in the telecommunication arena as a pillar of the forthcoming 5G telecommunication architecture. Therefore the scope of this panel is to trigger an open discussion between panellists and audience about mmWave technology, its current status and main technical hurdles, with emphasis on standards and regulatory bodies. The panel will focus on some key questions, among which: Why at all - Advantages and disadvantages of mmWave vs. WiFi and other wireless technologies; European collaborative research projects – What are the main ones currently working on mmWave-related aspects?; Use cases and deployment scenarios – What are the most relevant ones and what will be the main benefits for the final user?; First prototypes – What are the main hurdles at the PHY layer in 28/40/60/90 GHz bands?; Standardization – What is the current status and what are the forthcoming activities? A broad palette of expertise and visions from different angles (academia, research institutes, industry and regulatory body) will ensure a complete coverage of the topics under focus, which, by all means, can also be tuned according to the feedback received from the audience during the discussion.

Dr. Valerio Frascolla obtained the MSc and the PhD in electrical engineering from Ancona University, Italy, where he worked as research fellow till 2006, when he moved to Germany to join Comneon as concept engineer, focusing on SW architectures for mobile phones and attending 3GPP CT1 and CT Plenary standardization bodies. In 2010 he moved to Munich and joined Infineon Technologies as funding and research project manager, focusing on design and requirement management of wireless platforms. Since 2011 he is the European responsible person for funding activities and innovation manager at Intel Mobile Communications. Dr. Frascolla is an experienced project and program manager, obtained the CSM and CSPO certifications in 2013, has been contributing in different roles to several European and national funded projects and acts as facilitator of innovation using agile methodologies. He has a track record of technical excellence, is author of several papers, invited speaker and member of numerous TPC. His research interests are in Hw/Sw co-design, 5G wireless communications and low-power system design.

Dr. Laurent Dussopt received the Ph.D. degree in electrical engineering from the University of Nice-Sophia Antipolis, France. From September 2000 to October 2002, he was a research fellow with The University of Michigan at Ann Arbor where he developed reconfigurable microwave circuits and antennas based on RF-MEMS technology. Since 2003, he has been with CEA-LETI, France, as a research engineer and project leader on radio and antenna systems. He was appointed as chief scientist of the Systems and Integration Solutions division of CEA-LETI in 2013. Since 2014, he coordinates the EU project MiWaveS on millimeter-wave communications for access and backhaul in future wireless heterogeneous networks.

Dr. Dussopt has published more than 150 scientific papers in international journals and conferences and several book chapters, he is a senior member of IEEE and a research director of CEA. His research interests include mainly advanced antenna systems for wireless communications at microwave and millimeter-wave frequencies.

Zhinong Ying is a principle engineer of antenna technology in the Network research Lab within the Technology Office, Sony Mobile Communication AB, Lund, Sweden, also as a distinguish engineer within the whole Sony group. He joined Ericsson AB in 1995. He became Senior Specialist in 1997 and Expert in 2003 in his engineer career at Ericsson. He served as TPC Co-Chairmen in International Symposium on Antenna Technology (iWAT), 2007, He has been a guest professor in Zhejiang University, China since 2001. He is a senior member of IEEE. He was a member of scientific board of ACE program (Antenna Centre of Excellent in European 6th frame) from 2004 to 2007. He has authored and co-authored over 120 papers in various of journal, conference and industry publications. He holds more than 110 patents and pending in the antenna and mobile network areas. He contributed several book chapters including “Mobile Antenna Handbook 3rd edition” edited by H. Fujimoto and “Handbook of Antenna Technologies” edited by Z. N. Chen. He had invented and designed various types of multi-band antennas and integrated antennas for the mobile industry.

His main research interests are small antennas, broad and multi-band antenna, multi-channel antenna (MIMO) system, antenna for body area network, antenna and propagation in 5th generation mobile network including massive MIMO and mm wave, near- field and human body effects and measurement techniques.

Mark Beach is a Professor in Radio Systems Engineering at the University of Bristol (UK) pursing research in the field of 5G wireless connectivity. This includes the use and characterisation of millimetre wave bearers, massive MIMO based wireless access and disruptive technologies such as full-

duplex. Mark also manages the EPSRC Centre for Doctoral Training in Communications hosted at Bristol is the technical programme co-chair of VTC 2015 Spring.

André Bourdoux received the M.Sc. degree in electrical engineering in 1982 from the Université Catholique de Louvain-la-Neuve, Belgium. He joined IMEC in 1998 and is now Principal Scientist in the "Circuits and Systems for ICT" Department of IMEC. He is a system level and signal processing expert for the mm-wave and sub-10 GHz baseband teams and for the mm-wave radar team. His current research interests are multi-disciplinary, spanning the areas of wireless communications and signal processing, with a special emphasis on broadband systems and emerging physical layer techniques. He holds several patents in these fields. He contributes for IMEC to mm-wave standards in IEEE802.11 and IEEE802.15. He is the author and co-author of over 120 publications in books and peer-reviewed journals and conferences.

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 next generation mobile communications standards (5G), including the EU's Horizon 2020 5G PPP and UK's 5GIC initiative. He also represents, on behalf of Samsung, the terminal and device sectors in the EU' 5G Infrastructure Association. Prior to joining Samsung he was with BT (British Telecom) where he pioneered and led research in cognitive radio, white space and dynamic spectrum sharing technologies as well as providing technical consultancy on 4G spectrum auction and mobile strategy to business units. In additions to his experience in mobile and telecom industry he has 15 years of experience in leading and conducting research in top UK universities, including Imperial College and UCL, and collaboration with top universities in Europe, USA, Korea and China. Maziar has a PhD in theoretical physics and a first degree and MSc in electrical engineering (cum laude) both obtained in the Netherlands. He has published over 90 peer-reviewed papers and one book (on cognitive radio), and has several patents. His current research focuses on research for future standardisation of disruptive technologies for 5G radio access networks, including mm-Wave communications and spectrum sharing technologies.

Federico Boccardi is a Principal within Spectrum Technology in Ofcom. He received the M.Sc and Ph.D. degrees in Telecommunication Engineering from the University of Padova, Italy, in 2002 and 2007 respectively, and the Postgraduate Diploma in Strategy and Innovation from the Oxford Saïd Business School in 2014. Before joining Ofcom, he was with Bell Labs (Alcatel-Lucent) from 2006 to 2013 and with Vodafone R&D in 2014. During his career, he held leadership positions in different EU collaborative projects and in the 3GPP standardisation activity for LTE and LTE-Advanced. He carried out research and led research projects on MIMO, MMW communications, device-centric architectures, CoMP and small cells. He holds more than 100 between issued or pending patents, peer-reviewed international research papers and 3GPP contributions. He is an Associate Editor for IEEE Transactions on Wireless Communications and IEEE Transactions on Cognitive Communications and Networking. His current interests fall at the intersection between technology innovation and strategy.

Wednesday 13 May 2015, 11:00–12:30 (Level 1 Auditorium)

Software Defined 5G Networks and Services

Moderator:	**David Soldani**	*Vice President (VP) of Huawei European Research Centre (ERC)*
Panelists:	**Dirk Trossen**	*Principal Engineer, InterDigital Europe*
	Gunnar Mildh	*Expert in radio network architecture, Ericsson Research*
	Xavier Costa-Pérez	*Head of the Wireless & Backhaul Networks R&D Group, NEC Laboratories Europe*
	Bernard Barani	*Deputy Head of Unit European Commission, DG, Connect, Belgium*
	Jean-Sébastien Bedo	*Strategic Advisor, Orange Labs Research, France*

This panel will address the main issues related to the definition and embedding of a "plastic" 5G architecture that supports Control and User Plane (re-)configurability as well as flexible C-Plane procedures. The architecture is expected to meet the most crucial 5G requirements, especially in terms of latency, reliability for mission critical machine communication and scalability to billions of connections, as well as new delay critical services, such as virtual reality office, teleprotection for smart grid, real-time remote computing for mobile terminals etc; and to enable the integration of heterogeneous next generation devices. Based on emerging technologies, such as SDN, NFV and cloud/edge computing, new procedures and protocols for an efficient and unified connection, mobility, security and routing management need to be redesigned so that they can run on top of the SDN directly as applications, developed and tested against state of art 3GPP functions, running on virtual machines in cloud platforms and SDN based transport network layer. The distinguished speakers will present their views on this important subject, possible solutions, what needs to be tested and standardized to realize this vision.

David Soldani received a M.Sc. degree with maximum score and "cum laude approbatur" in Electronic Engineering from the University of Florence, Italy, in 1994; and a D.Sc. degree in technology with distinction from Aalto University, Finland, in 2006. In 2014, he was appointed Visiting Professor at the University of Surrey, UK. He is one of the top experts in multi-disciplinary, transformative frontier research. He has been active in the ICT field for more than 20 years, successfully working on 150+ R&D projects for 2-5G and contributing to 100+ quality deliverables: from strategic research and innovation to modeling, simulations, emulations and innovative proof of concepts with stakeholders. Dr. Soldani is currently Vice President (VP) of Huawei European Research Centre (ERC) and Head of Central Research Institute (CRI) in Europe. Areas of his responsibility and expertise include, but not limited to: Future Wireless, Network, IoT and Multimedia Technologies. Dr. Soldani represents Huawei in the Board of the 5G Infrastructure Association, in Brussels, and Steering Board (SB) of NetWorld2020 European Technology Platform (ETP), in Europe.

Dirk Trossen is a Principal Engineer at InterDigital Europe, the European branch of InterDigital Inc. His main responsibility lies in establishing the European presence of InterDigital through engagements within the EU-funded

Horizon 2020 workprogramme as well as within UK-funded efforts. Dirk has more than 15 years of experience in network architectures, services and wireless technology. His main contributions can be found in the area of inter-domain networking as well as seamless handovers and new service concepts for operators. He was the technical lead of the European efforts PSIRP and PURSUIT, performing research on large-scale publish-subscribe information-centric networking systems in the context of the Future Internet. He is also an active contributor to European efforts in the 5G(PPP) space through contributions to ETP and 5GPPP whitepapers.

Prior to joining InterDigital, Dirk was co-founder of TecVis LP, a UK-based software solution company in the mobile, context-aware solution space and he held prior positions as a Senior Researcher with Cambridge University, Chief Researcher with BT Research and as a Principal Scientist at Nokia Research. He is also a research affiliate with the Advanced Network Architecture group at MIT CSAIL. He holds a Ph.D. degree in Computer Science from Technical University of Aachen, Germany. He published more than 75 peer-reviewed papers in international conferences and journals and has currently 32 international patents.

Gunnar Mildh received his M.Sc. in electrical engineering from the Royal Institute of Technology (KTH), Stockholm, Sweden, in 2000. In the same year, he joined Ericsson Research, Ericsson AB, Stockholm, and has since been working on standardization and concept development for GSM/EDGE, HSPA, and LTE(-A). His focus areas has been on radio network architecture and protocols, and recently on 5G architecture including RAN and Packet Core. He is currently an expert in radio network architecture at the Wireless Access Network Department, Ericsson Research.

Dr. Xavier Costa-Pérez is the Head of the Wireless & Backhaul Networks R&D Group at NEC Laboratories Europe, where he has managed several projects related to mobile networks. In the wireless LAN area, he led a team contributing to NEC's mobile phones evolution, which received an R&D Award for the work on N900iL, NEC's first 3G/WiFi phone. In the 4G area he managed a team researching on next generation base stations which received NEC's R&D Award for successful technology transfers. In 3GPP he contributed to the SA1 RAN Sharing Enhancements efforts where new requirements for future systems were defined. In IEEE he contributed to the development of the 802.11e and 802.11v standards being included in the major contributor list. He has served on the Program Committees of several conferences (e.g. IEEE Greencom, WCNC, and INFOCOM), published over 50 papers and holds over 20 patents. He received both his M.Sc. and Ph.D. degrees in Telecommunications from the Polytechnic University of Catalonia (UPC) and was the recipient of the national award for the best Ph.D. thesis on 'Multimedia Convergence in Telecommunications'.

Dr. Bernard Barani graduated from the École Nationale Supérieure des Télécommunications de Bretagne in 1982. He then served as communications engineer in industry on military infrared systems and then with the European Space Agency on advanced satcom programmes. In 1994, he joined the European Commission Directorate General "Information Society", and was responsible for implementation of research and policy issues in wireless communication, Internet, audio visual systems, Software and Services. He has been Deputy head of the unit dealing with research and policy in the field of RFID, Internet of Things and networked enterprise systems. He is currently Deputy head of the unit in charge of research and innovation on Network Technologies in the CONNECT Directorate General of the European Commission. His responsibilities cover the definition of the research strategy related to future networks (5G) and systems based on connected objects (IoT) in support of EU industry competitiveness.

Jean-Sébastien Bedo graduated from Ecole Polytechnique and Télécom ParisTech in 2004. He is a member of the Board of Directors of 5G Infrastructure Association and of the Steering Board of NetWorld2020 ETP. Since 2009, he has been working for Orange Innovation, Marketing and Technologies department as strategic advisor for network technology choices. Before that, he was head of Orange research activities in economics. He co-advised six Ph.D. and post-doctoral students. He was also involved in several collaborative European research projects and published journal and conference articles on smart grid economics, Internet networks, and traffic forecasting.

Wednesday 13 May 2015, 18:00–19:30 (Main Auditorium)

What is driving 5G?

Moderator:	**David Kennedy**	*Director, Eurescom*
Panelists:	**Rahim Tafazolli**	*Director of 5GIC and Institute of Communication Systems, University of Surrey*
	Simone Redana	*Radio Research & Line Manager, Nokia Networks*
	Hans-Peter Mayer	*Head of Next Generation Wireless Research, Bell Labs Wireless*
	Paul Crane	*Head of Practice, Research and Innovation, BT*
	Olav Queseth	*Senior Researcher, Ericsson*

The 5G vision lies in the future development of a hyper-connected society with business, people, things and services connected anywhere and anytime. The realization of this vision is driven by two streams of development: the demand and market creation for 5G networks and services and the development of the technologies to address new challenging service scenarios, which cannot be offered by current 4G networks. The new services are demanding stepwise improvements in capacity, connectivity, latency, throughput and performance and all this must be provided with dramatic improvements in energy consumption, availability, security, reliability and efficiency - and all this must be available for significantly less cost. We must also stress the point that 5G is not 4G + 1. It must be a new network concept incorporating all access technologies. The panel will address the promising opportunities and directions that European industry is taking in terms of Standards, Spectrum usage and needs, new 5G radio interface(s) design, interference management, device centric networking and security approaches to deal with the explosion in the number of devices. A significant improvement in the mobile quality of experience through ultra-fast big data and content distribution should be delivered by these future cellular networks.

David Kennedy, Director of Eurescom in Germany, has a background in Network planning from his time with Eircom in Ireland and many years' experience in Collaborative research projects and initiatives both in Ireland and with Eurescom in Germany. More recently he has been involved in the European Future Internet initiative and now the European 5G initiative. Eurescom also hosts and operates the CELTIC-PLUS Eureka Cluster Office which is also active in supporting research on Networks and solutions for future communications from an End to End perspective. His current ambitions include ensuring high speed connectivity will become available across Europe in an economic and viable form within the next decade.

Rahim Tafazolli is the Director of the Institute for Communication Systems (ICS) and 5G Innovation Centre (5GIC), University of Surrey in the UK. He has published more than 500 research papers in refereed journals, international conferences and as invited speaker. He is the editor of two books on "Technologies for Wireless Future" published by Wiley's Vol.1 in 2004 and Vol.2 2006. He is currently board member of many national and international research and innovation initiatives. He was appointed as Fellow of WWRF (Wireless World Research Forum) in April 2011, in recognition of his personal contribution to the wireless world. As well as heading one of Europe's leading research groups.

Dr. Simone Redana received the MSc and Ph.D. degrees from the Politecnico di Milano, Italy, in 2002 and 2005 respectively. In 2006, he joined Siemens Communication in Milan. Since 2008 he has been with Nokia Networks in Munich (previously Nokia Siemens Networks from 2007 till 2013 and Nokia Solutions and Networks from 2013 till 2014), where he is currently Radio Research & Line Manager. Simone contributed to the relay concept design in the EU project WINNER II and the Eureka Celtic project WINNER+ as well as he led the work package on advanced relay concept design in the EU project ARTIST4G. He contributed to the business case analysis of relay deployments and to the standardization of Relays for LTE Release 10. He led research and standardization projects on Self-Organizing Network (SON) for LTE Release 11. His current research interests are on new methods to access more spectrum for IMT and on novel architecture solutions for 5G.

Hans-Peter Mayer is Head of Next Generation Wireless research within Bell Labs Wireless. He received a PhD degree in Physics from University of Tübingen in 1987. After joining Alcatel-Lucent he worked on high-speed optoelectronic components. Between 1992 and 1995 he led the research and industrialization activity on 1.55µm DFB lasers for WDM and for 10 Gb/s systems, later including integrated and hybrid optoelectronics.

From 1996 to 1999, Dr. Mayer has led the research on the early UMTS definition, followed by the realization of first UMTS, HSPA and LTE trial systems. Hans-Peter Mayer has done several research projects on LTE advanced; he was the co-initiator for the German EASY-C project and the FP7 project ARTIST. Today he is leading Bell Lab's research on 5G wireless systems, with involvement in the European METIS, 5GNOW and future projects in Horizon 2020.

Paul Crane is Head of Practice in BT's Research and Innovation group. Paul leads applied research activities in Mobile, Network Services and Sustainability. The objective of this work is the development and delivery of technical solutions for next generation services. His current research activities are focused on the application of emerging mobile technologies to needing the needs of consumer and business customers. Paul is a telecommunications engineer, with over 20 years in the industry. He has undertaken a variety of from strategic technology roles with BT in the UK, USA and Europe. Paul has a personal interest in the development of voice, multimedia communications and mobile technology.

Dr. Olav Queseth received his MSc in computer engineering in 1995 from Chalmers, Sweden and a PhD degree in 2005 from KTH, Sweden in Radio Communications Networks. He is currently working at Ericsson as a senior researcher. He joined the 5G research project METIS in 2012 and since April 2014 he is the project coordinator. Prior to that he has worked with spectrum issues in the regulatory domain and before that he worked with standardization of radio aspects in 3GPP. He joined Ericsson in 2007 after doing spectrum research in the Ambient networks EU research project.

Tutorials

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

TUTORIALS					
		Royal College R4.32	Royal College R4.48	Conference Room 8	Royal College R4.46
MONDAY 11 May					
7:30-17:30		Registration (Level 2 lobby)			
8:30-10:00		T1: Collaborative Near-Capacity Wireless System Design	T3: Visible Light Communications	T5: The Path Towards 5G—Essential Technologies, Protocols and Tools for Enabling 5G Mobile Communications	T7: Real World Desktop Software Defined Radio using the RTL-SDR
12:00-13:30		Lunch available in Level 2 Café			
13:30-15:00		T2: Multi Objective Optimization Techniques for Designing Next-Generation Autonomous Communication Networks	T4: Communication Architectures and Networks for Electric Vehicles in the Smart Grid	T6: Optimizing 5G Networks for Energy-Efficiency: Dense or Massive MIMO or Both?	T7: Real World Desktop Software Defined Radio using the RTL-SDR

Monday, 11 May 2015, 9.00 – 12.30 Royal College R4.32

T1: Collaborative Near-Capacity Wireless System Design

Lajos Hanzo, University of Southampton

The limitations of MIMOs relying on co-located array-elements are highlighted and it is shown, how the single-antenna aided cooperative mobiles may circumvent these limitations by forming MIMOs having distributed elements. This concept is also referred to a Virtual Antenna Arrays (VAA). Then the corresponding amplify-forward and decode-forward protocols as well as their hybrids are studied. Channel coding has to be specifically designed for the VAAs in order to prevent avalanche-like error-propagation. Hence sophisticated three-stage-concatenated iterative channel coding schemes are proposed and it is argued that in the absence of accurate channel information at the relays the best way forward might be to use multiple-symbol differential detection.

Indeed, it is rather unrealistic to expect that an altruistically relaying handset would also accurately estimate the source-relay channel for the sake of high-integrity coherent detection. EXIT-chart-aided designs are used for creating near-capacity solutions and a range of future research directions as well as open problems are stated.

Lajos Hanzo (http://www-mobile.ecs.soton.ac.uk) Royal Society Wolfson Fellow, FREng, FIEEE, FIET, Fellow of EURASIP, DSc received his degree in electronics in 1976 and his doctorate in 1983. In 2009 he was awarded the honorary doctorate 'Doctor Honaris Causa' by the Technical University of Budapest. During his 35-year career in telecommunications he has held various research and academic posts in Hungary, Germany and the UK. Since 1986 he has been with the School of Electronics and Computer Science, University of Southampton, UK, where he holds the chair in telecommunications. He has successfully supervised 80 PhD students, co-authored 20 John Wiley/IEEE Press books on mobile radio communications totalling in excess of 10 000 pages, published 1400+ research entries at IEEE

Xplore, acted both as TPC and General Chair of IEEE conferences, presented keynote lectures and has been awarded a number of distinctions. Currently he is directing an academic research team, working on a range of research projects in the field of wireless multimedia communications. He is an enthusiastic supporter of industrial and academic liaison and he offers a range of industrial courses. He is also a Governor of the IEEE VTS. During 2008 - 2012 he was the Editor-in-Chief of the IEEE Press and since 2009 he has been a Chaired Professor also at Tsinghua University, Beijing. For further information on research in progress and associated publications please refer to http://www-mobile.ecs.soton.ac.uk

Monday, 11 May 2015, 13.30 – 17.00 Royal College R4.32

T2: Multi Objective Optimization Techniques for Designing Next-Generation Autonomous Communication Networks

Keivan Navaie, University of Leeds

Next generation communication systems are often envisaged as an interconnected set of a variety of autonomous communication entities each with a particular set of quality-of-service requirements competing for acquiring access to limited shared resources. Next generation heterogeneous networks act as a vital technical enabler for future internet-of-things. Multi-Objective Optimization (MO) provides a capable analytical tool for modelling and investigating the behaviours of heterogeneous communication networks and offers critical information for designing efficient interoperations among autonomous entities.

This tutorial briefly covers the analytical foundation of convex and non-convex MO including, the concept of optimality and non-dominance, stability and robustness as well interactive and evolutionary techniques for obtaining optimal solutions. A variety of MO applications are then discussed including instructor's recent research works in spectrum sharing, adaptive cognitive beam-forming and inter-system bargaining protocol design for cognitive cellular networks.

Keivan Navaie (SMIEEE) received his Ph.D. in 2004. From March to November 2004, he was with the School of Mathematics and Statistics, Carleton University, Ottawa, Canada, as a Postdoctoral Research Fellow working on stochastic modelling of wireless networks. From December 2004 to September 2006, he was with the Broadband Communication and Wireless System (BCWS) Centre, Carleton University, Ottawa, Canada where he was the project manager of BCWS participation in European Union 6th Framework integrated project, the Wireless World Initiative New Radio (WINNER) on beyond 3G wireless systems. From September 2006 to July 2011 he was with the Department of Electrical and Computer Engineering, Tarbiat Modares University, Tehran, Iran. From July 2011 to November 2014 he has been with the School of Electrical and Computer Engineering, University of Leeds, Leeds, UK. He is currently a Senior Lecturer in the school of Computing and Communications, University of Lancaster, Lancaster, UK also a visiting research scientist in Telefonica Research and Innovation, Barcelona, Spain. His research interests lie in the field of radio resource allocation for wireless communication systems, dynamic spectrum allocation, cognitive radio networks, cooperative communications and stochastic network modeling. He has published more than 100 papers in peer reviewed journal and conference proceedings. Dr. Navaie is on the editorial board of the European Transactions on Telecommunications. He has also served as (co)Chair of Wireless Network Track, IEEE VTC2012-Spring in Yokohama, Japan and IEEE 8th International Workshop on Wireless Network Measurements WiNMee 2012 in Paderborn, Germany, IEEE VTC2014-Spring in Seoul, South Korea, and IEEE WCNC 2014 in Istanbul, Turkey. He is the recipient of the 2011 IEEE Iran Section Young Investigator award. His paper, "Access strategies for spectrum sharing in fading environment: Overlay, underlay and mixed," was in the IEEE Communication Society Best readings on Cognitive Radio 2012. Dr. Navaie is Senior Member of the IEEE, and a Chartered Engineer in the UK.

Monday, 11 May 2015, 9.00 – 12.30 Royal College R4.48

T3: Visible Light Communications

Harald Haas, University of Edinburgh

This tutorial comprehensively explores visible light communication (VLC). It explains how VLC has evolved during the 15 years from a relatively low data-rate point-to-point wireless communication system to a gigabit wireless networking technology, which we refer to as Li-Fi. The tutorial demonstrates how Li-Fi enables full cellular networking including multiuser access, full duplex communication and handover. We will work out the fundamental differences to radio frequency (RF) communications, and discuss opportunities and limitations. In this context, the tutorial will address general misconceptions such as: 'this is a line-of-sight technology', 'it does not work in sun light', 'the lights cannot be dimmed', 'there are no Li-Fi products on the market', etc. We will discuss state-of-the-art physical layer and networking techniques that are specifically developed for Li-Fi. This includes techniques to realise effective modulation, diversity, cooperative transmission, MIMO, multiuser access and interference mitigation by taking into account the specific features of VLC. We will discuss the opportunities Li-Fi will generate to realise hybrid Li-Fi/RF systems for effective load balancing and new sleep mode concepts for significantly improved overall energy efficiency. The tutorial also reviews novel devices such as micro LEDs, single photons avalanche diodes (SPAD) which have the potential to significantly enhance future Li-Fi systems. We will provide latest results from application studies. The tutorial closes with a demonstration of Li-Fi.

Harald Haas holds the Chair of Mobile Communications at the University of Edinburgh. His main research interests are in visible light communications, hybrid optical wireless and RF communications, and interference coordination in wireless networks. Professor Haas has first introduced and pioneered Spatial Modulation. He introduced and coined 'Li-Fi'™ which was listed among the 50 best inventions in TIME Magazine 2011. He was an invited speaker at TED Global 2011, and his talk has been watched online more than 1.5 million times. He is co-founder and chief scientific officer (CSO) of pureLiFi Ltd. Professor Haas holds 29 patents and has more than 25 pending patent applications. He has published 300 conference and journal papers including a paper in Science. He was a recipient of the prestigious Established Career Fellowship from the EPSRC (Engineering and Physical Sciences Research Council) in 2012. Haas is recipient of the Tam Dalyell Prize 2013 awarded by the University of Edinburgh for excellence in engaging the public with science. In 2014 Prof. Haas was selected as one of 10 EPSRC RISE Leaders in the UK recognising inspirational scientists and engineers.

Monday, 11 May 2015, 13.30 – 17.00 Royal College R4.48

T4: Communication Architectures and Networks for Electric Vehicles in the Smart Grid

Hussein T. Mouftah, University of Ottawa; Melike Erol-Kantarci, Clarkson University

This tutorial aims to furnish the audience with the essential tools to understand the fundamentals of electric vehicles, their interaction with the smart grid and introduce the state-of-the-art architectures, models and networks for the electric vehicle infrastructure. Utilities, telecom operators, OEMs, service providers and researchers are among the target audience.

Dr. Hussein T. Mouftah is a Distinguished University Professor and Senior Canada Research Chair in Wireless Sensor Networks at the School of Electrical Engineering and Computer Science of the University of Ottawa, Canada. He has been with the ECE Dept. at Queen's University (1979-2002), where he was prior to his departure a Full Professor and the Department Associate Head. He has six years of industrial experience mainly at Bell Northern Research of Ottawa (then known as Nortel Networks). He has been a Distinguished Speaker of the IEEE Communications Society (2000-2008). He is the author or coauthor of 10 books, 65 book chapters and more than 1400 technical papers, 14 patents and 143 industrial reports. He is the joint holder of 20 Best Paper and/or Outstanding Paper Awards. He has received numerous prestigious awards. Dr. Mouftah is a Fellow of the IEEE (1990), the Canadian Academy of Engineering (2003), the Engineering Institute of Canada (2005) and the Royal Society of Canada RSC Academy of Science (2008).

Dr. Melike Erol Kantarci is an assistant professor at the Department of Electrical and Computer Engineering at Clarkson University, Potsdam, NY. Previously, she was the coordinator of the Smart Grid Communications Lab and a postdoctoral fellow at the School of Electrical Engineering and Computer Science, University of Ottawa, Canada. She received the Ph.D. and M.Sc. degrees in Computer Engineering in 2009 and 2004, respectively. During her Ph.D. studies, she was a Fulbright visiting researcher at the Computer Science Department of the University of California Los Angeles (UCLA). She received the B.Sc. degree from the Department of Control and Computer Engineering at the Istanbul Technical University, in 2001. She has received a Fulbright PhD Research Scholarship (2006) and the Siemens Excellence Award (2004), and she has won two Outstanding/Best Paper Awards.

Monday, 11 May 2015, 9.00 – 12.30 Conference Room 8

T5: The Path Towards 5G—Essential Technologies, Protocols and Tools for Enabling 5G Mobile Communications

Marco Di Renzo, Christos Verikoukis, Emil Björnson, Eduard Jorswieck, Cheng-Xiang Wang

The fifth-generation (5G) is coming. Quo vadis 5G? What architectures, network topologies and technologies will define 5G? Are methodologies to the analysis, design and optimization of current cellular networks still applicable to 5G? The proposed tutorial is intended to offer a comprehensive and in-depth crash course to communication professionals and academics. It is aimed to critically illustrate and discuss essential and enabling transmission technologies, communication protocols and architectures that are expected to make 5G mobile communications a reality.

Marco Di Renzo received the Ph.D. degree in Electrical and Information Engineering from the University of L'Aquila, Italy, in January 2007. Since January 2010, he has been a Tenured Academic Researcher with the French National Center for Scientific Research (CNRS), as well as a faculty member of the Laboratory of Signals and Systems (L2S), CNRS, SUPELEC, and the University of Paris-Sud XI, Paris, France. His main research interests are in the area of wireless communications theory and stochastic geometry.

Christos Verikoukis got his Ph.D. from the Technical University of Catalonia in 2000. He is currently the Head of the SMARTECH department at CTTC and an adjunct associate professor at Barcelona University. His area of expertise is in the design of energy efficient layer 2 protocols and RRM algorithms.

Emil Björnson received the Ph.D. degree in Telecommunications from the Department of Signal Processing at KTH Royal Institute of Technology, Sweden, in 2011. He is currently an Assistant Professor at Linköping University, Sweden. His research interests include multi-antenna cellular communications, massive MIMO techniques, radio resource allocation, green energy efficient systems and network topology design.

Eduard Jorswieck received his Doktor-Ingenieur (Ph.D.) degree from the Technische Universität Berlin, Germany, in 2004. Since February 2008, he has been the head of the Chair of Communications Theory and Full Professor at TUD, Germany. Dr. Jorswieck's main research interests are in the area of signal processing for communications and networks.

Cheng-Xiang Wang received the PhD degree in Wireless Communications from Aalborg University, Denmark, in 2004. He has been with Heriot-Watt University, UK since 2005, and became a Professor in Wireless Communications in 2011. His main research interests are in the area of channel modeling for 5G cellular systems, with special emphasis on mmWave communications.

Monday, 11 May 2015, 13.30 – 17.00 Conference Room 8

T6: Optimizing 5G Networks for Energy-Efficiency: Dense or Massive MIMO or Both?

Emil Björnson, Linköping University; Luca Sanguinetti, University of Pisa

Suppose that a 5G wireless network is designed from scratch to bring a uniform user experience with maximal energy efficiency (EE) as the main goal. How would such a network look like? To answer this fundamental question we need to understand how the EE depends on various network design parameters: the density and distribution of access points; the number of antennas deployed at each access point; the number of user terminals that can be served simultaneously; the beamforming that maps antennas to users; the average radiated signal power per user; and the hardware characteristics. In this tutorial, the EE metric [bit/Joule] is defined as the ratio between *sum area throughput [bit/s/km^2]* and are*a power consumption [Joule/s/km^2]*. A survey is first provided on how to model these main terms accurately, to take all important system parameters and dependences into account. Based on the developed models, the EE is maximized using tools from both mathematical optimization and stochastic geometry. This leads to closed-form expressions that describe how the main design parameters depend on one another. The results and insights are exemplified for two tractable cases of network deployment: regular patterns of base stations (e.g., hexagonal cells) and stochastic patterns based on Poisson point processes. We will see how small cells and massive MIMO techniques show up naturally as energy-efficient solutions. In the last part of the tutorial, we describe how to optimize 5G networks with respect to more than one metric; for example, energy efficiency, user throughput, and area throughput.

Emil Björnson received the M.S. degree in Engineering Mathematics from Lund University, Sweden, in 2007. He received the Ph.D. degree in Telecommunications from KTH Royal Institute of Technology, Sweden, in 2011. 2012—July 2014, he was a joint postdoc at Supélec, Paris, France, and KTH Royal Institute of Technology. He is currently an Assistant Professor at Linköping University, Sweden. His expertise spans multi-antenna cellular communications, massive MIMO techniques, radio resource allocation and energy efficient networks. He is the first author of the book "Optimal Resource Allocation in Coordinated Multi-Cell Systems" from 2013. He is dedicated to reproducible research and published much simulation code. Dr. Björnson has received 4 best paper awards for novel research on optimization and design of multi-cell multi-antenna communications.

Luca Sanguinetti is an Assistant Professor in the Dipartimento di Ingegneria dell'Informazione of the University of Pisa, since 2005. He received the Telecommunications Engineer degree (cum laude) and the Ph.D. degree in information engineering from the University of Pisa, Italy, in 2002 and 2005, respectively. In 2004, he was a visiting Ph.D. student at the German Aerospace Center (DLR), Oberpfaffenhofen, Germany. June 2007—2008, he was a postdoctoral associate at Princeton. From July 2013 to June 2015, he is with Supélec, Paris, France. He is currently serving as an Associate Editor for IEEE Transactions on Wireless Communications. His expertise spans the areas of communications and signal processing, estimation and detection theory. Current research topics are dense deployments for green cellular networks, development of game-theoretic solutions for energy-efficient interference mitigation and analysis of the impact of user mobility in the energy consumption of wireless networks. He the co-recipient of best paper awards at WCNC 2013 and WCNC 2014. He is also the recipient of the FP7 Marie Curie IEF Grant Dense4Green "Dense deployments for green cellular networks".

Monday, 11 May 2015, 9.00 – 17.00 Royal College R4.46

T7: Real World Desktop Software Defined Radio using the RTL-SDR

Bob Stewart, Louise Crockett, University of Strathclyde; Neil MacEwen, MathWorks Ltd.

In this tutorial we will present the fundamental theory behind the design of a generic PHY layer software defined radio (SDR) and demonstrate the first principles implementation, design and real time operation of an SDR using off-the-air signal live in the tutorial. We will use the $20 RTL-SDR USB device which can produce 8 bit I/Q samples at up to 2.8MHz sampling rate and receive over the range 50MHz to almost 1.7GHz. As part of the tutorial we will build a first SDR implemented AM and then FM radio receiver, followed by implementations and demonstrations of 433MHz and 868MHz digital QAM receivers. We will also be viewing some other signals around us (from IoT temperature sensors, mobile/wireless and so on). We will view all signals and build all components and designs from first principles DSP theory using MATLAB/Simulink and run real time on a standard Windows PC hosting MATLAB and drivers for the RTL-SDR. Attendees will receive a free USB RTL-SDR stick and access to all presented materials, instruction in, and use of full MATLAB/Simulink desktop and course notes including open versions of all of the SDR designs (and more) that were presented.

Bob Stewart is the MathWorks Professor of Signal Processing in the Department of Electronic and Electrical Engineering at the University of Strathclyde. He has more than 20 years of experience teaching DSP and communications to industry and student audiences.

*Dr. Louise Crockett is an academic in the Department of Electronic and Electrical Engineering at the University of Strathclyde. Her current R&D work is with Xilinx FPGAs on the implementation of SDR and other DSP systems. She is also the lead author of the best selling text, **The ZynqBook on FPGAs**, jointly published with Xilinx in 2014.*

Dr. Neil MacEwen is the technical lead on Software Defined Radio at the MathWorks Glasgow Office and has extensive experience on design of SDR radio based systems. He was awarded his PhD in 2008 for work on OFDM receivers.

MathWorks Industrial Workshop

MathWorks

IEEE VEHICULAR TECHNOLOGY CONFERENCE – GLASGOW
Thursday May 14, 2015,10:30 AM, Auditorium B
(room subject to change. Please see final conference program to confirm room location)

"MATLAB and Simulink Platform for Next Generation Wireless System Development"
Moderator: Professor Bob Stewart, MathWorks Professor of Signal Processing, Univ. Strathclyde

SESSION AGENDA

- Keynote: Accelerating Wireless System Development – D. Orofino, K. Karnofsky, MathWorks
- LTE-Advanced Design, Waveform Generation, and Over-the-Air Testing with Zynq-based SDR – Martin Enderwitz, Univ. Strathclyde; D. Garcia-Alis, I. Stirling, N. MacEwen, O. Sadiq, MathWorks
- Antenna-to-bits Simulation for Wireless Receiver Design – M. McLernon, H. Zarrinkoub, MathWorks
- Design of FMCW Radars for Vehicular Active Safety Applications - Marc Willerton, MathWorks
- HDL Coder Implementation of an LTE OFDM Modulator and Detector - Ross Elliot, Univ. Strathclyde; G. Rice, MathWorks
- Polynomial Matrix Decomposition Tools for Broadband MIMO and Array Processing - Stephan Weiss and Keith Thompson, Univ. of Strathclyde; John McWhirter, Cardiff Univ.; Ian Proudler, Loughborough Univ.

For product information, visit mathworks.com/solutions/communications-systems

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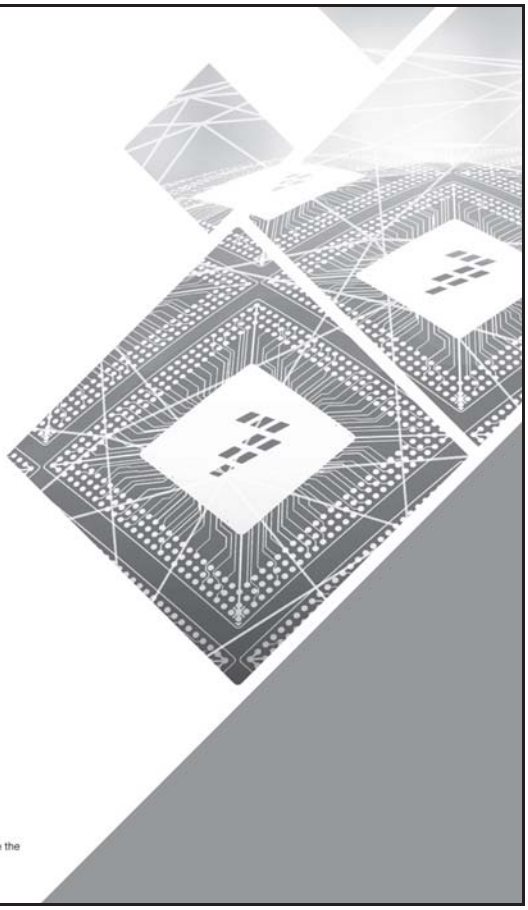

freescale

Workshops

W1: 3rd Workshop on 5G Mobile and Wireless Communication Systems for 2020 and beyond (MWC2020)

The purpose of the workshop is to gather researchers and industry to share views on requirements and technical enablers for the coming 5G mobile and wireless system. These enablers may be components of the protocol stack (PHY, MAC or upper layers), or new architectural models.

It is widely accepted that the future mobile infrastructure will have to cope not only with a quantitative growth of the requirements we are facing today (higher capacity, data rate, number of connected devices) but also with qualitatively new requirements (higher reliability, larger versatility, application domain specific topologies) resulting from a broader scope of application domains to be supported.

In 2020, mobile and wireless traffic volume is expected to increase thousand-fold over 2010 figures. Moreover, an increase in the number of wirelessly connected devices in the tens of billions will have a profound impact on society. Massive machine communication, forming the basis for the Internet of Things, will make our everyday life more efficient, comfortable and safer, through a wide range of applications including traffic safety and medical services. The variety of applications and traffic types originating from or reaching mobile, WLAN, and sensor networks, will be significantly larger than today, and will result in more diverse requirements on services, devices and networks.

To meet the demands beyond 2020, a system that broadens the use of today's wireless networks is needed. Fundamentally new concepts and design approaches are needed, and these must be integrated into systems that provide the necessary flexibility, versatility and scalability at low cost and low energy consumption. This workshop presents a forum for exchange of ideas between all stakeholders.

Organising Committee:
Olav Queseth, Ericsson Research
Youngnam Han, KAIST
Patrick Marsch, Nokia Networks
Jose F. Monserrat, Polytechnic University of Valencia
Dongku Kim, Yonsei University
Sunghyun Choi, Seoul National University
Mikael Fallgren, Ericsson Research
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Peter Fertl, BMW
Seong-Lyun Kim, Yonsei University
Seunghwan Lee, ETRI
Stefan Heinen, Aachen University of Technology
Thomas Haustein, Heinrich Hertz Institut Berlin
Tommi Jämsä, Elektrobit
Wonil Roh, Samsung Electronics
Yongwan Park, Yeungnam University

Program

Monday 11 May 9:00-10:00 Main Auditorium C

Keynote speakers and Welcome

Chair: Olav Queseth, Ericsson Research, Sweden

1 NGMN view on 5G
Mikio Iwamura, Director, Wireless Research Group, DOCOMO Communications Laboratories Europe GmbH

2 The road to 5G
Stefan Parkvall, Principal Researcher, Ericsson

Monday 11 May 10:30-12:00 Main Auditorium C

Enablers of the 5G system

Chair: Narcis Cardona, Polytechnic University of Valencia

1 NGMN - 5G Initiative: 5G Vision
Armando Annunziato, Telecom Italia

2 On the Feasibility of Blind Dynamic TDD in Ultra-Dense Wireless Networks
Haris Celik, Ki Won Sung, KTH Royal Institute of Technology

3 VehiCaching: Embracing User Request on Vehicle Route with Proactive Data Transportation
Wonkwang Shin, Byoung-Yoon Min, Dongku Kim, Yonsei University

4 Rate Fairness based QoS provisioning for Operators in 5G Shared Networks
Osman Aydin, Danish Aziz, Bell Labs, Alcatel-Lucent; Eduard Jorswieck, Dresden University of Technology

Monday 11 May 13:30-14:30 Main Auditorium C

The 5G RAN: What is reality beyond the hype

Chair: Olav Queseth, Ericsson Research, Sweden

Panelists: Olav Queseth, Klaus Pedersen, Seung Hwan Lee, Hans Schotten, Frank Schaich

Monday 11 May 14:30-15:30 Main Auditorium C

Machine-Type & Device to Device Comms

Chair. Hans Schotten, University of Kaiserslautern, Germany

1 **Frame length reduction for Massive-Machine Communications**
Carole Al Bechlawi, Frederic Guilloud, Telecom Bretagne

2 **Large-Scale Fading based Power Allocation for Device-to-Device Underlay Cellular Communication**
Xinxin Liu, Qiang He, Yunzhou Li, Jing Wang, Tsinghua University

3 **Path-loss and Throughput Prediction of IEEE 802.11ad Systems**
Angelos Goulianos, Andrew Nix, Nor Fadzilah Abdullah, Mark Beach, Thomas Barratt, Simon Armour, University of Bristol

Monday 11 May 16:00-16:45 Main Auditorium C

Resource allocation

Chair: Jose F. Monserrat, Polytechnic University of Valencia, Spain

1 **Energy-Efficient Proportional Resource Allocation in Uplink OFDMA Systems**
Peng Lan, Saidan Gong, Lilin Dan, Yue Xiao, University of Electronic Science and Technology of China

2 **Time-Frequency Coupled Proportional Fair Scheduler with Multicarrier Awareness for LTE Downlink**
Jose F. Monserrat, David Martin-Sacristan, Daniel Calabuig, Narcis Cardona, Polytechnic University of Valencia

W23: Massive MIMO and Millimeter-waves for 5G Networks Workshop (mmW5G-WS)

Massive MIMO and millimetre-waves (mmW) are seen as key technology enablers for future 5G wireless mobile networks. In fact, only taking advantages of multiple radio access technologies will allow achieving higher capacities and bandwidths, reduced system power consumption and lower electromagnetic field exposure. The lack of un-fragmented available spectrum resources below 6 GHz and the considerable progress of mmW radio technologies over the last few years have triggered a strong interest for the exploitation of mmW bands in future wireless cellular networks for both backhauling and access. Massive MIMO is also considered among the most promising technologies to achieve the challenging 5G system KPI and to take full advantage of those in such new scenarios. This workshop will bring together academic researchers and industrial professionals to identify and discuss technical challenges and recent results related to mmW and massive MIMO in the context of future 5G mobile wireless networks.

Organising Committee:
Emilio Calvanese Strinati, CEA-LETI
Valerio Frascolla, Intel Mobile Communications
Thomas Haustein, Fraunhofer HHI
Zhinong Ying, Sony Mobile Communications
Laurent Dussopt, CEA-LETI
Mathini Sellathurai, Heriot Watt University
Bruno Clerckx, Imperial College London
Constantinos Papadias, Athens Information Technology
Tharmalingam Ratnarajah, The University of Edinburgh
Kei Sakaguchi, Osaka University
Yue Frank Gao, Queen Mary University of London
Thorsten Dräger, National Instruments
Jessica Oueis, CEA-LETI

Program

Monday 11 May 10:00-11:50 Main Auditorium B

Emerging Massive MIMO Technology

Chair: Sellathurai Mathini, Heriot Watt University, UK

1 **Single-RF Transmission: An Emerging Technology for both Link and Multi-User MIMO Systems (Keynote)**
Constantinos Papadias, Athens Information Technology

2 **A Novel Power Control Algorithm for Massive MIMO Cognitive Radio Systems Based on Game Theory**
Manman Cui, Bin-jie Hu, Xiaohuan Li, South China University of Technology; Hongbin Chen, Guilin University of Electronic Technology

3 **Generalized Semi-Orthogonal Multiple-Access for Massive MIMO**
Majid Nasiri Khormuji, Huawei Technologies Sweden AB

4 **A Distributed Massive MIMO Testbed to assess Real-World Performance & Feasibility**
Paul Harris, Siming Zang, Andrew Nix, Mark Beach, Simon Armour, Angela Doufexi, University of Bristol

5 **Statistical Analysis of the Channel Capacity Outage Intervals in Massive MIMO Systems with OSTBC over Rayleigh Fading Channels**
Rym Hicheri, Nazih Hajri, Néji Youssef, Ecole Supérieure des Communications de Tunis; Matthias Pätzold, University of Agder; Tsutomu Kawabata, University of Electro-Communications

Monday 11 May 13:30-15:00 Main Auditorium B

MM-Wave Channel Modeling and Characterisation

Chair: Valerio Frascolla, Intel Mobile Communications, Germany

1 **Unlocking spectrum above 6 GHz for 5G and IoT: Key Technologies and Uses (Keynote)**
Maziar Nekovee, Samsung Electronics UK

2 **Characterisation of Channel Measurements at 70GHz in Indoor Femtocells**
Stephan Häfner, Diego Andres Dupleich, Robert Müller, Christian Schneider, Reiner Thomä, TU Ilmenau; Jian Luo, Egon Schulz, Huawei; Xiaofeng Lu, Tianxiang Wang, Huawei

3 **Validation of a Geometry-Based Statistical mmWave Channel Model Using Ray-Tracing Simulation**
Qian (Clara) Li, Hooman Shirani-Mehr, Tommaso Balercia, Apostolos Papathanassiou, Geng Wu, Intel Corporation; Shu Sun, Mathew Khalil Samimi, Theodore S. Rappaport, NYU Wireless

4 **Channel Estimation Using a 2D DFT for Millimeter-Wave Systems**
Stefano Montagner, Nevio Benvenuto, University of Padova; Paolo Baracca, Bell Labs, Alcatel-Lucent

Monday 11 May 15:30-17:00 Main Auditorium B

MM-Wave Antennas and Channel

Chair: Laurent Dussopt, CEA-LETI, France

1 **Opportunities of mmWave technology in 5G access and backhaul**
Jyri Putkonen, Nokia

2 **On the Mutual Orthogonality of Millimeter-wave Massive MIMO Channels**
Sinh Nguyen, Katsuyuki Haneda, Jan Jarvelainen, Aki Karttunen, Aalto University; Jyri Putkonen, Nokia

3 **mmWave Phased Array in Mobile Terminal for 5G Mobile System with Consideration of Hand Effect**
Kun Zhao, KTH; Jakob Helander, Lund University; Zhinong Ying, Sony Mobile Communications AB; Daniel Sjöberg, Mats Gustafsson, Lund University; Sailing He, KTH Royal Institute of Technology

4 **Human Exposure of mmWave Phased Array Antennas in Mobile Terminal for 5G Mobile System**
Kun Zhao, KTH; Zhinong Ying, Sony Mobile Communications AB; Sailing He, KTH Royal Institute of Technology

W4: International Workshop on 5G Architecture (5GArch 2015)

in conjunction with EU FP7 METIS and iJOIN projects

Mobile networks have become the main communication vehicle for the upcoming connected society. In addition to humans, billions of machines will be connected to the network in the future, yielding a 10.000 traffic increase beyond 2020. However, such traffic increase does not necessarily lead to a similar increase in the revenue of mobile network operators, which need to make very high investments to handle all this traffic. This challenges the deployment of a mobile network that can satisfy the requirements of the society and at the same time is sustainable for network operators. A fundamental piece to address this challenge is the design of a novel mobile network architecture that provides the necessary flexibility to offer new services in an efficient way and inherently can share or distribute infrastructure resources dynamically, such that operators can increase their revenue through the new services, while leveraging the efficiency of the architecture to do so in a cost-effective way.

Current mobile networks are not well suited to address the above challenge. In 4G mobile networks, large effort was made in making the air interface fully adaptive to changing radio conditions, but lack similar functionality to optimize the network side. Eventually, while current architectures have been very successful in the last few years, they do not provide the required flexibility to cope with the service and traffic diversity required by 5G mobile networks as well as the current trends in terms of topologies. Such trends (in terms of traffic and topologies) make networks increasingly heterogeneous and require tailored solutions to adapt to each specific scenario and service in an efficient way. In order to overcome the limitations of today's networks, the central goal of this workshop is to discuss about future mobile network architectures that can flexibly adapt its operation to the specific characteristics and requirements of a given service and scenario.

Organising Committee:
Simone Redana, Nokia Networks
Uwe Dötsch, Alcatel Lucent
Albert Banchs, IMDEA Networks
Cinzia Sartori, Nokia Networks
Hans Schotten, University Kaiserslautern
Technical Program Committee:
Bessem Sayadi, Alcatel Lucent
Miguel Angel Puente, ATOS
Roberto Lambiasse, Azcom Technology
Markus Breitbach, Deutsche Telekom
Xavier Costa, NEC
Mischa Dohler, King´s College London
Eiko Seidel, Nomor Research
Serban Purge, Orange, France
Simon Saunders, Real Wireless
Ignacio Berberana, Telefonica
Andreas Klein, University Kaiserslautern
Sabella Dario, Telecom Italia
Andreas Maeder, NEC
Dirk Wübben, University of Bremen
Jens Bartelt, Technical University Dresden
Salim, Umer, Intel
Marco Di Girolamo, HP
Atta Quddus, University of Surrey
Massinissa Lalam, Sagemcom
Heinz Droste, Deutsche Telekom
Josef Eichinger, Huawei
Venkatkumar Venkatasubramanian, Nokia Networks
Neiva Lindqvist, Ericsson
Gerd Zimmerman, Deutsche Telekom
Makis Stamatelatos, University of Athens

Program

Monday 11 May 9:00-9:15 Main Auditorium A

Opening

Monday 11 May 9:15-10:00 Main Auditorium A

Keynote: 5G - Why We Need a Radical New Architecture

Uwe Janssen, Deutsche Telekom

Monday 11 May 10:30-12:00 Main Auditorium A

5G Architecture I

Chair: Albert Banchs, IMDEA Networks, Spain

1 A NOvel Radio Multiservice adaptive network Architecture for 5G networks
Albert Banchs, IMDEA Networks; Uwe Doetsch, Alcatel-Lucent Bell Labs; Markus Breitbach, Deutsche Telekom; Xavier Costa, NEC Laboratories; Simone Redana, Cinzia Sartori, Nokia Networks

2 NGMN View on 5G Architecture
NGMN Alliance, Next Generation Mobile Networks; Mikio Iwamura, DOCOMO Communications Laboratories Europe

3 The METIS 5G Architecture
Heinz Droste, Gerd Zimmermann, Deutsche Telekom; Makis Stamatelatos, National and Kapodistrian University of Athens; Neiva Lindqvist, Ericsson Research; Ömer Bulakci, Josef Eichinger, Huawei ERC; Venkatkumar Venkatasubramanian, Nokia Networks; Uwe Dötsch, Alcatel-Lucent Bell Labs; Hugo Tullberg, Ericsson Research

4 Benefits and challenges of cloud technologies for 5G architecture
Dario Sabella, Telecom Italia; Peter Rost, NEC Laboratories; Albert Banchs, IMDEA Networks; Valentin Savin, CEA; Marco Consonni, HP; Marco Di Girolamo, HP; Massinissa Lalam, Sagemcom; Andreas Maeder, NEC Laboratories; Ignacio Berberana, Telefonica I+D

5 Tight Integration of new 5G air interface and LTE to fulfill 5G requirements
Icaro Da Silva, Johan Rune, Gunnar Mildh, Pontus Wallentin, Ericsson, Rui Fan, Schliwa-Bertling Schliwa-Bertling, Ericsson

Monday 11 May 13:00-13:45 Main Auditorium A

Keynote: Architecture Vision for the 5G Era

Volker Ziegler, Nokia Networks

Monday 11 May 13:45-15:15 Main Auditorium A

5G Architecture II

Chair: Uwe Doetsch, Alcatel-Lucent Bell Labs, Germany

1 Caching in flat mobile networks: design and experimental analysis
Fabio Giust, University Carlos III of Madrid; Gerald Kunzmann, DOCOMO Communications Laboratories Europe; Daniele Munaretto, University of Padova; Carlos J. Bernardos, University Carlos III of Madrid; Bessem Sayadi, Alcatel-Lucent Bell Labs

2 Prediction of Dynamic Crowd Formation in Cellular Networks for Activating Small Cells
Nandish P Kuruvatti, Andreas Klein, Hans D Schotten, University of Kaiserslautern

3 A Seamless Integration of Computationally-Enhanced Base Stations into Mobile Networks towards 5G
Miguel Angel Puente, Atos; Zdenek Becvar, Matej Rohlik, Czech Technical University in Prague; Felicia Lobillo, Atos; Emilio Calvanese, CEA

4 Mobile Low Latency Services in 5G
Andrea F. Cattoni, Aalborg University; Devaki Chandramouli, Cinzia Sartori, Rainer Stademann, Paolo Zanier, Nokia Networks

5 Tackling the increased density of 5G networks; the CROWD approach
M. Isabel Sanchez, Universidad Carlos III de Madrid; Arash Asadi, IMDEA Networks; Martin Dräxler, University of Paderborn; Rohit Gupta, National Instruments; Vincenzo Mancuso, IMDEA Networks; Arianna Morelli, INTECS; Antonio de la Oliva, Universidad Carlos III de Madrid; Vincenzo Sciancalepore, IMDEA Networks

Monday 11 May 15:45-17:00 Main Auditorium A

5G Architecture Requirements & Components

Chair: Simone Redana, Nokia Networks

Panelists: Mikio Iwamura, NTT DoCoMo;
Nicolas Chuberre, Thales Alenia Space;
Uwe Janssen, Deutsche Telekom;
Volker Ziegler, Nokia Networks

Monday 11 May 17:00-17:15 Main Auditorium A

Closing

W5: WWRF Workshop on 5G Services and Applications

The growing research in and discussions of 5G connectivity is already changing many perspectives in the communications landscape. It changes the way we view Internet services and introduces the world of pervasive and always-connected mobile services. This will includes services that are ubiquitous and available to everyone at almost every point in a given area, indoor or outdoor and dominated by machine-to-machine (M2M) connectivity with communications feature integrated into every-day devices.

With this rapid proliferation of advanced services and applications, the users are being drowned by the sheer number of digital online services and applications. The user base has exploded, and with ever more services are moved to the digital world a new digital ecosystem is emerging with still uncertain business models associated. The Wireless World Research Forum has been leading global 5G development and has already run multiple workshops on 5G technologies. This workshop continues the 5G workshop series by looking at the 5G development from the user perspective. The challenge of this workshop is to look at the interfaces between technology, services and users and to identify the requirements and expectations for future services and business models. As an outcome, this workshop will produce a state-of-the-art vision of how 5G applications and services may develop beyond 2020.

The workshop is organized by the Wireless World Research Forum (WWRF) (www.wwrf.ch). WWRF is a global collaboration between industry and academia whose goal is to encourage global research that will achieve unbounded communications to address key societal challenges for the future.

Program

Tuesday 12 May 14:00-15:30 Conference Room 8

Session

1 Accessing and Disclosing Protected Resources: A User-Centric View
Henning Olesen, Samant Khajuria, Aalborg University / CMI

2 5G Visions of User Privacy
Lene Sorensen, Aalborg University; Samant Khajuria, Aalborg University / CMI; Knud Erik Skouby, University of Aalborg

3 5G-Enabled Distributed Services
Greig Paul, James Irvine, University of Strathclyde

Tuesday 12 May 14:00-15:30 Conference Room 8

Panel: 5G Applications and Services

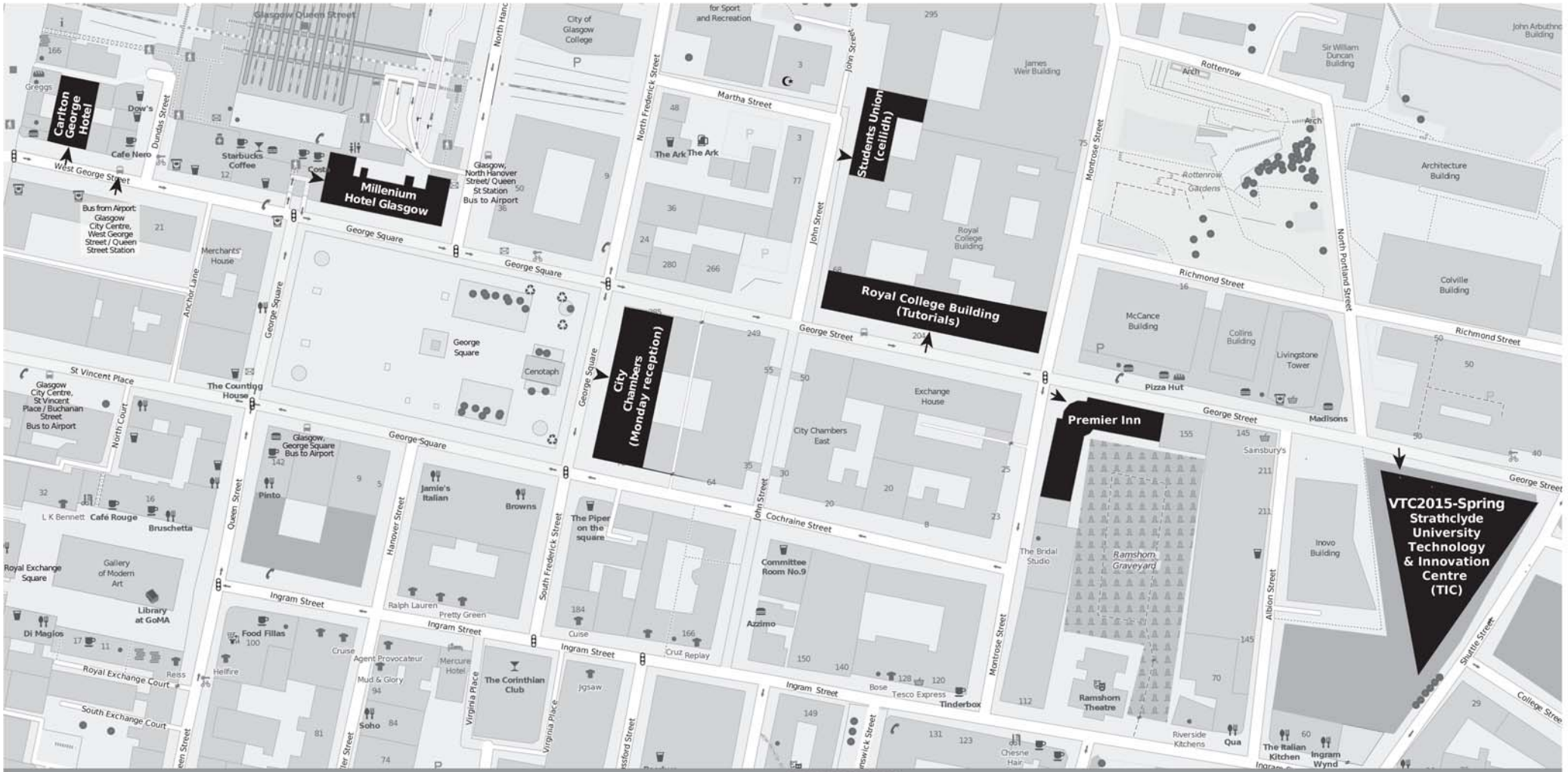
Mikael Anneroth, Ericsson Research
Klaus David, Kassel University
James Irvine, University of Strathclyde
Knud Erik Skouby, Aalborg University

W6: Emerging Device Centric Communications in 5G

From 2G to 4G systems are based on network centric approach, but 5G networks are envisioned to take a radically different approach by moving towards Device Centric Systems (DCS). The main drivers of DCS are the emerging Internet of Things (IoT) and Big Data applications, which will exploit the intelligence at the device side, to support reliable and secure device-to-device (D2D) connectivity. Inspired by such a paradigm shift, this workshop solicits contributions across various aspects ranging from radio protocols to energy efficient networking topologies, and lightweight security. This workshop will bring together academic and industrial researchers to identify and discuss technical challenges and recent results related to DCS communication.

Organising Committee:
Muhammad Ali Imran, University of Surrey
Shahid Mumtaz, Instituto de Telecomunicações Aveiro Portugal
Syed Ali Raza Zaidi, University of Leeds
Jonathan Rodriguez, Instituto de Telecomunicações
Muhammad Zeeshan Shakir, Texas A&M University at Qatar

Technical Program Committee:
Ayman Radwan, Instituto de Telecomunicações
Christos Politis, Kingston University
Tasos Dagiuklas, University Of Patras
Zakaria Hanzaz, University of Kaiserslautern
Christos Verikoukis ,CTTC, Barcelona
Tapani Ristaniemi ,University of Jyväskylä
Paulo Marques,Instituto de Telecomunicações
Baldomero Coll Perales, Universidad Miguel Hernández
Mehdi Bennis, University of Oulu
Michela Meo, Politecnico di Torino
Abhaya Sumanasena, Hutchinson 3G
Najah Abu Ali ,United Arab Emirates University
Henrik Lundqvist ,Huawei
Kevin Quinn , Waterford Institute of Technology
Du Yang , Instituto de Telecomunicações
Joaquim Bastos,Instituto de Telecomunicações
Marco Maso, Huawei France Research Center
Des McLernon, University of Leeds
Evariste Logota, Instituto de Telecomunicações
Vahid Nazari Talooki ,Instituto de Telecomunicações
Firooz Bashashi Saghezchi, Instituto de Telecomunicações
Riccardo Bassoli, Instituto de Telecomunicações,
Victor Sucasas, Instituto de Telecomunicações
Kazi Huq, Instituto de Telecomunicações
Ikram Ashraf ,University of Oulu
Fawaz Al-Qahtani, Texas A&M University at Qatar
Mounir Ghogho, University of Leeds



WORKSHOPS

		Conference Room 1	Conference Room 2	Conference Room 3	Conference Room 4	Conference Room 5	Conference Room 6	Conference Room 7	Conference Room 8	Main Auditorium A	Main Auditorium B	Main Auditorium C
MONDAY 11 May												
7:30-17:30		Registration (Level 2 lobby)										
8:30-10:00		W4: 5G Architecture 2015	W14: Full-Duplex Radios and Systems (DUPLO)	W9: Data Analytics for Dynamic Environments (DADE2015)	W7: Self-Organizing Networks (IWSON)	W8: Intelligent Design and Performance Evaluation of LTE-Advanced Networks	W6: Emerging Device Centric Communications in 5G	W11: Heterogeneous Networking for the Internet of Things	(see Tutorials)	W16: 5G New Air Interface	W2/W3: Emerging MIMO Technologies and Millimeter-waves for 5G Networks	W1: 5G Mobile and Wireless Communication Systems for 2020 and Beyond
10:00-10:30		Coffee and Refreshments (Level 3 foyer)										
10:30-12:00		W4 continued	W14 continued	W9 continued	W7 continued	W8 continued	W6 continued	W11 continued	(see Tutorials)	W16 continued	W2/3 continued	W1 continued
12:00-13:30		Lunch available in Level 2 Café										
13:30-15:00		W4: 5GArch 2015	W14: DUPLO	W10: Global and Social Resource Sharing in/through Wireless Networks	W7: IWSON	W12: Service-Oriented Computing in Disconnected, Intermittent and Limited Networks	W13: Integrating Communications, Control, Computing Technologies for Smart Grid	W11: Het Net for IoT	(see Tutorials)	W16: 5G New Air Interface	W2/W3: Emerging MIMO	W1: MWC2020
15:00-15:30		Coffee and Refreshments (Level 3 foyer)										
15:30-17:00		W4 continued	W14 continued	W10 continued	W7 continued	W12 continued	W13 continued	W11 continued	(see Tutorials)	W8 continued	W2/3 continued	W1 continued
18:00-19:00		Welcome Reception (Glasgow City Chambers)										
19:15-late		Light Dinner and Ceilidh (University of Strathclyde Student Union)										

		Conference Room 1 (A)	Conference Room 2 (B)	Conference Room 3 (C)	Conference Room 6 (D)	Conference Room 7 (E)	Conference Room 8 (F)	Main Auditorium B (G)	Main Auditorium C (H)	Level 1 Auditorium (I)	Conference Room 4/5 (P(a) / P(b))	
MONDAY 11 May												
7:30-17:30		Registration (Level 2 lobby)										
8:30-17:00		Tutorials, Workshops and other events: See separate program										
18:00-19:00		Welcome Reception (Glasgow City Chambers)										
19:15-late		Light Dinner and Dancing (University of Strathclyde Student Union)										
TUESDAY 12 May												
7:30-17:30		Registration (Level 2 lobby)										
8:30-9:45		Opening Plenary: Humza Yousaf, Scottish Govt Min. for Europe/International Affairs; Tariq Durrani, Honorary Chair; Javier González & James Irvine, General Co-chairs; Fabrice Labeau, VTS President (Main Auditorium)										
9:45-10:30		Keynote: **5G: The Nervous System of the Digital Society and Digital Economy** by David Soldani, Huawei (Main Auditorium)										
10:30-11:00		Refreshments and Exhibits (Level 3 foyer)										
11:00-12:30	(1)	M2M Communications	Channel Measurement, Characterization and Modeling I	Performance Evaluation of Wireless Networks	Energy Efficiency & Harvesting	RF Design and Evaluation	Mobile Network Applications & Services			**Panel: mmWave Technology for Telecomms**	Spectrum Efficient Management, Sensing and Cognitive Radio	
12:30-14:00		Lunch (Levels 2 and 3 - see map)										
14:00-15:30	(2)	Wireless Mesh Networks	Channel Measurement, Characterization and Modeling II	Radio Resource Management I	Energy Efficiency in MIMO & DAS	Channel Coding	Workshop W5	Interference Management I	Transmission Technologies I	Opportunistic Spectrum Access and TV White Space	Multiple Antenna Systems and Services	
15:30-16:00		Refreshments and Exhibits (Level 3 foyer)										
16:00-17:30	(3)	D2D	Channel Estimation	Duplexing and UL/DL resource allocation	Energy Efficient Base Stations and Networks	Equalization	Workshop W5	mm-Wave and 3D MIMO	Transmission Technologies II	Cognitive and Cooperative Networks	Cooperative Communications, Distributed MIMO and Relaying	
18:15-22:00		VTC2015-Spring Banquet at Kelvingrove Museum and Art Gallery (Buses depart from TIC at 18:15)										
WEDNESDAY 13 May												
7:30-17:30		Registration (Level 2 lobby)										
8:30-9:00		IEEE VTS Awards and Introduction to Future VTCs										
9:00-10:30		Keynotes: **5G Mobile Comms: Key Enabling Techs and Recent R&D Results** (Wonil Roh, Samsung Electronics); **Visual Communication** (Thomas Weigand, Fraunhofer Heinrich Hertz Inst) (Main Auditorium)										
10:30-11:00		Refreshments and Exhibits (Level 3 foyer)										
11:00-12:30	(4)	Smart Grid and Electric Vehicles	Channel Characterization	Radio Resource Management II	MIMO Antennas and Array Signal Processing	Spectrum Sensing	Cellular and Heterogeneous Networks			**Panel: Software Defined 5G Networks and Services**	Transmission Technologies and Communication Theory I	
12:30-14:00		Lunch (Levels 2 and 3 - see map)										
14:00-15:30	(5)	Electric Vehicles	Performance Analysis in Propagation Channels I	Channel Modeling and Estimation	Multiuser MIMO	5G and Future Cellular Networks I	Mobile and Ad Hoc Networks	Interference Mitigation and Advanced CoMP Techniques	Green Cognitive Radio & WSN	Smart Resource Usage I	Transmission Technologies and Communication Theory II	Satellite Networks, Positioning and Location
15:30-16:00		Refreshments and Exhibits (Level 3 foyer)										
16:00-17:30	(6)	Wireless Sensor Networks	Performance Analysis in Propagation Channels II	Performance Analysis	MIMO Transmission	5G and Future Cellular Networks II	Signal Detection	Network Coding for Cooperative Communications	Green HetNets & Cloud RAN	Smart Resource Usage II	Vehicular Electronics and Communications	Antennas, Propagation and RF Design
17:00-18:00		Exclusive Reception for VTS Members (Level 9)										
18:00-19:30		Evening Panel: **What is driving 5G?** (Main Auditorium)										
THURSDAY 14 May												
7:30-17:30		Registration (Level 2 lobby)										
8:30-10:00		Keynotes: **Enabling Automotive IoT** by Andy Birnie, Freescale; **Wireless Communications for Vehicle Safety and Automated Driving** by Luca Delgrossi, Mercedes-Benz (Main Auditorium)										
10:00-10:30		Refreshments and Exhibits (Level 3 foyer)										
10:30-12:00	(7)	Vehicular Channel Characterization and Performance Evaluation	Indoor Localisation and Positioning	Heterogeneous Networks I	Self-Organisation and Collaboration	mmW Communications and Massive MIMO	Scheduling and Resource Allocation for Cooperative Communications	**Mathworks Industry Session**			Green Communications and Networks	Ad-hoc, Mesh, Machine-to-Machine and Sensor Networks
12:00-13:30		Lunch (Levels 2 and 3 - see map)										
13:30-15:00	(8)	Vehicular Applications, Driver Assistance and Adaptive Traffic Lights	Localisation and Positioning Algorithms	**National Instruments Industry Session**	Cloud Systems and Data Mining	Network MIMO, Distributed Beamforming and Space-time Coding	Multiple Access	Heterogeneous Networks II	Interference Management II		Wireless Networks, Applications and Security	
15:00-15:30		Refreshments and Exhibits (Level 3 foyer)										
15:30-17:00	(9)	Vehicular Networking, MAC and Security Protocols	Satellite Systems and Models	**National Instruments Industry Session**	Physical Layer Security and Cryptography	Performance Analysis of Cooperative Communications	Receiver Design	Heterogeneous Networks III	Small Cells		Wireless Access	

Program

Monday 11 May 08:30-10:00 Conference Room 6

Device Centric Communications I

Chair: M. Imran, University of Surrey,UK.

1 Distance Based Cooperation Region for D2D Pair
Hafiz Atta Ul Mustafa, University of Surrey; Muhammad Zeeshan Shakir, Texas A&M University at Qatar; Muhammad Ali Imran, Rahim Tafazolli, University of Surrey

2 Self-Organized Energy Efficient Scheduling in LTE-A
Valdemar Monteiro, Shahid Mumtaz, Jonathan Rodriguez, Instituto de Telecomunicações; Ikram Ashraf, University of Oulu,

3 Analysis of Composite Fading in a Single Cell Downlink Cooperative Heterogeneous Networks
Atta ur Rahman, Syed Ali Hassan, National University of Science & Technology

4 Recent Progress in 5G Non-Orthogonal Multiple Access for Device Centric Communication (Invited Talk)
Zhiguo Ding, Lancaster University

Monday 11 May 10:30-12:30 Conference Room 6

Device Centric Communications II

Chair: Shahid Mumtaz, Instituto de Telecomunicações, Portugal

1 Moving towards User and Device Centric Communications in Future Wireless Networks (Invited Talk)
John Thompson, University of Edinburgh

2 User Centric Communication in 5G (Invited Talk)
Maziar Nekovee, Samsung Electronics R&D

Posters

1 Hybrid Serial Concatenated Network Codes for Burst Erasure Channels
Riccardo Bassoli, Vahid Talooki, Hugo Marques, Instituto de Telecomunicações

2 Detection of Co-Channel Systems Using Combination of Basic Network Coding and HARQ
Adnan Ahmed Khan, Amna Qayyum, National University of Sciences and Technology; Muhammad Ali Imran, University of Surrey

3 Distributed Optimal Quantization and Power Allocation for Sensor Detection Via Consensus
Edmond Nurellari, D. C. McLernon, Mounir Ghogho, Syed Ali Raza Zaidi, University of Leeds

Panel: D2D potential as a prime source of content delivery in 5G

Mythri Hunukumbure, Sunil Vadgama , Fujitsu; Maziar Nekovee, Samsung

W7: 5th International Workshop on Self-Organizing Networks (IWSON)

The 5th IWSON workshop follows the previous four events at VTC in Budapest 2011, ISWCS in Paris 2012, VTC in Dresden 2013, and ISWCS in Barcelona 2014. Self-Organizing Network (SON) paradigm applied to wireless communications networks has been receiving growing interest by network operators due to the urge to simplify network management complexity, reduce operational costs, while benefitting from optimized network performance.

Currently, we note rising interest in SON for future radio access technologies beyond LTE and LTE-Advanced, but also for field experience from LTE SON deployments, SON coordination approaches and techniques, SON features tailored to the needs of multi-radio access technology, multi-layer and multi-vendor networks, end-to-end SON solutions, impact of SDN/NFV advancements on SON, and enhancement of SON with cognition and learning capabilities.

With the success of the first four IWSON events in Budapest, Paris, Dresden and Barcelona, and the progressive focus on SON as the means to improve the performance and operability of mobile radio networks, it is timely and important to continue this workshop series bringing together people with SON interests. The IWSON workshop is intended to attract both industry and academia, primarily with a focus on 3GPP technologies such as LTE, but other systems can be considered as well.

The 5th IWSON workshop comprises four sessions covering different challenging aspects in the area of SON: management aspects of SON in mono- and multi-vendors' scenarios; radio SON functions for managing interference, predict QoS degradation and enhance capacity using new antenna concepts; a session dedicated to simulations and demonstrations with a policy-based SON management demonstrator; and a session dedicated to traffic steering.

Organising Committee:
Fredrik Gunnarsson, Ericsson Research
Kostas Tsagkaris, University of Piraeus
Lars Christoph Schmelz, Nokia Networks
Markus Gruber, Alcatel-Lucent Bell Labs
Thomas Kurner, Technische Universitat Braunschweig
Zwi Altman, Orange Labs

Technical Program Committee:
Afef Feki, Huawei
Alexandros Kaloxylos, University of Peloponnisos
Andreas Eisenblätter, Atesio GmbH
Andreas Mitschele-Thiel, Technische Universität Ilmenau
Apostolos Kousaridas, University of Athens
Berna Sayrac, Orange Labs
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David López-Pérez, Bell Labs Alcatel-Lucent
Di Yuan, Linköping University
Eleni Patouni, University of Athens
Hans van den Berg, TNO
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Jordi Perez-Romero, Universitat Politecnica de Catalunya (UPC)
Kristina Zetterberg, Ericsson Research
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Matías Toril, University of Málaga
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Panagiotis Vlacheas, University of Piraeus (UPRC)
Panagiotis Demestichas, University of Piraeus (UPRC)
Bernhard Bauer, Universität Augsburg
Raquel Barco, University of Málaga
Sana Ben Jemaa, Orange Labs
Sándor Imre, Technical University of Budapest
Tapani Ristaniemi, University of Jyväskylä
Ulrich Barth, Alcatel-Lucent Bell Labs
Xavier Gelabert, Huawei Technologies Swede

Program

Monday 11 May 8:45-10:00 Conference Room 4

IWSON1: SON Management

Chair: Fredrik Gunnarsson, Ericsson

1 **How operators can differentiate through policies when sharing small cells**
Ilaria Malanchini, Markus Gruber, Alcatel-Lucent Bell Labs

2 **Classification of Cells Based on Mobile Network Context Information for the Management of SON Systems**
Sören Hahn, Thomas Kürner, Technische Universität Braunschweig; Simon Lohmüller, University of Augsburg; Andreas Eisenblätter, Dario Götz, atesio GmbH; Lars Christoph Schmelz, Nokia

Monday 11 May 10:30-12:00 Conference Room 4

IWSON2: Radio SON Functions

Chair: Lars Christoph Schmelz, Nokia

1 **A Hybrid Interference Control Scheme for Femto Cells using Overhearing and Limited SON Co-ordination**
Mythri Hunukumbure, Sunil Vadgama, Fujitsu Labs of Europe Ltd.

2 **Machine Learning Based Session Drop Prediction in LTE Networks and its SON Aspects**
Bálint Daróczy, András Benczúr, Hungarian Academy of Sciences (MTA SZTAKI); Péter Vaderna, Ericsson Research

3 **Virtual sectorization: Design and Self-Optimization**
Abdoulaye Tall, Zwi Altman, Orange Labs; Eitan Altman, INRIA

Monday 11 May 13:30-15:00 Conference Room 4

IWSON3: Demonstrations and Simulations

Chair: Kostas Tsagkaris, University of Piraeus

1 **Policy-based SON Management Demonstrator**
Simon Lohmüller, Christoph Frenzel, University of Augsburg; Andreas Eisenblätter, Dario Götz, Ulrich Türken, atesio GmbH; Sören Hahn, Thomas Kürner, Technische Universität Braunschweig; Andreas Lobinger, Lars Christoph Schmelz, Nokia; Remco Litjens, TNO; Bart Sas, iMinds / University of Antwerp

2 **SiMoNe – Simulator for Mobile Networks: System-Level Simulations in the Context of Realistic Scenarios**
Dennis M. Rose, Johannes Baumgarten, Sören Hahn, Thomas Kürner, Technische Universität Braunschweig

Monday 11 May 15:30-17:00 Conference Room 4

IWSON4: Traffic Steering

Chair: Zwi Altman, Orange Labs

1 **A SON Function for Steering Users in Multi-Layer LTE Networks Based on Their Mobility Behaviour**
Bart Sas, Kathleen Spaey, Chris Blondia, iMinds/University of Antwerp

2 **Distributed and Adaptive Optimization of LTE-TDD Configuration based on UE Traffic Type**
Mehrzad Malmirchegini, Rao Yenamandra, Kausik Ray Chaudhuri, Jose Edson Vargas Bautista, Qualcomm Inc.

W8: First International Workshop on Intelligent Design and Performance Evaluation of LTE-Advanced Networks

Although 4G network deployments are still incipient, the first upgrades towards LTE-A solutions are already planned by operators and further LTE-A features are defined in the standards. In parallel to these LTE-A standardization efforts, important research activities on 5G networks are currently getting under way. However, before post-LTE systems will be deployed, network operators need to achieve a satisfactory return on investment. To do so, the performance of LTE-A systems must be enhanced by means of intelligent design of LTE-A features and the fine tuning of the corresponding parameters. In particular, interference management is a key issue for the HetNet paradigm to achieve its promised capacity gains and multi-node cooperation, with its inherent interference mitigation capability is an ideal candidate for this challenge. Energy efficiency is another essential component of LTE-A, compelling energy saving mechanisms to be incorporated. Last but not least, techniques for offloading traffic from the macro-cell network to the small cells are seen as important solutions for increasing capacity and thus increasing user QoS. The workshop will focus on these aspects from a design and a performance evaluation points of view.

Program

Monday 11 May 10:30-12:00 Conference Room 5

Session 1

Keynote: Éric Hardouin

1 **Analytical Modeling of Downlink CoMP in LTE-Advanced**
Ahlem Khlass, Telecom ParisTech; Thomas Bonald, Salah Eddine Elayoubi, Orange Labs

2 **Capacity Dimensioning for Real-Time Video Services in Wireless Mobile Networks**
Yu-Ting Lin, Télécom ParisTech; Salah Eddine Elayoubi, Ridha Nasri, Orange Labs

3 **Impact of mobility in dense LTE-A networks with small cells**
Bruno Baynat, LIP6; Raluca-Maria Indre, Orange Labs; Narcisse Nya, LIP6; Philippe Olivier, Alain Simonian, Orange Labs

Monday 11 May 15:00-15:30 Level 3 Foyer

Posters Session

1 **Distributed Enhanced Inter-Cell Interference Coordination (eICIC) in LTE-Advanced HetNets: A Potential Game Approach**
Ye Liu, Chung Shue Chen, Alcatel-Lucent Bell Labs; CW Sung, City University of Hong Kong

2 **Accuracy of Location-Dependent Inter-Cell Interference Stochastic Model with Ranging Errors**
Fatima Zohra Kaddour, Benoît Denis, Dimitri Kténas, CEA-Leti Minatec

Monday 11 May 15:30-17:00 Conference Room 1

Session 2

1 **Virtual Small Cells Using Large Antenna Arrays as an Alternative to Classical HetNets**
Ana Galindo-Serrano, ALTEN; Sofia Martinez Lopez, Orange Labs; Alberto De Ronzi, Politecnico di Milano; Azeddine Gati, Orange Labs.

2 **Energy efficiency of heterogeneous network using on/off small cells in real large scale environment**
Gregory Gougeon, Mathieu Brau, Laurent Maviel, Yves Lostanlen, SIRADEL

3 **Alleviating cellular network congestion caused by traffic lights**
Hind Zaaraoui, Zwi Altman, Orange Labs

4 **Spectrum Sharing Approach between Radar and Communication Systems and its Impact on Radar's Detectable Target Parameters**
Haya Shajaiah, Ahmed Abdelhadi, Charles Clancy, Virginia Tech

5 **RNTI Aggregation for Multi-users Multiplexing Radio Voice Transmission for Enhancing Voice Capacity over LTE in PMR Context**
Manh-Cuong Nguyen, Hang Nguyen, Institut Telecom SudParis; Eric Georgeaux, Philippe Mege, Laurent Martinod, Cassidian Systems

W9: 1st International Workshop on Data Analytics for Dynamic Environments (DADE)

It is our great pleasure to welcome you to the 1st International workshop on Data Analytics for Dynamic Environments (DADE), held on the 11th of May 2015 in Glasgow, UK in conjunction with the 2015 IEEE 81st Vehicular Technology Conference: VTC2015-Spring. On behalf of DADE Organizing Committee, we would like to express a sincere and warm welcome to all the participants.

The volume of data produced on the Internet has increased exponentially in recent years. The Internet of Things and sensory devices are among the resources that have contributed to this rapid growth of data on the Internet. The data driven services and applications look for transforming this massive data into actionable information and insights to support decision-making process and to create situation-awareness. However, management and analysis of large volumes of data are still less developed than our capacity to collect information. We face relevant challenges to answer questions such as: How to use all this data? How to extract actionable information from it? How to deal with dynamicity of data and how to extract reliable information from data with variable qualities? This actionable information will be used in future services and applications, and vehicular communications to provide (near) real time intelligence about the environment and provide context-aware and situation-aware services.

DADE workshop will explore the data analytic solutions to extract actionable information from real time information in dynamic environments, such as vehicular networks and smart city environments. It provides a forum for engineers and scientists from academia, industry and public organizations to share their views on many challenging research problems and to present and discuss their novel ideas, research results, new applications and experience concerning all aspects of data analytics and evaluations for real time and context aware applications. DADE2015 is co-sponsored by EU FP7 CityPulse project (http://www.ict-citypulse.eu/).

In its first edition DADE consists of 5 paper presentations, and 1 distinguished keynote. For the successful organisation of an international workshop we counted on the great support of many people and organisations. First of all, we would like to thank the organising committee of VTC2015-Spring, Tariq Durrani (University of Strathclyde, UK), Honorary Chair, Javier Gozalvez (Miguel Hernandez University of Elche, Spain) and James Irvine (University of Strathclyde, UK), General co-chairs and Klaus Moessner (University of Surrey, UK) and Chang-Xiang Wang (Heriot-Watt University, UK) Workshop Co-chairs for giving helping us to organise the workshop. We would like to express our appreciation to Prof Ralf Toenjes (University of Applied Sciences Osnabrueck) for accepting our invitation to give a keynote talk at the workshop.

We would like to give our special thanks to the Technical Program Committee of the workshop for their excellent work and great efforts in disseminating the call for papers and publicising the workshop and supporting the review process.

We take this opportunity to thank all of the authors, participants and session chairs for their valuable efforts, many of whom have traveled long distances to attend this conference and make their valuable contributions.

We thank all of DADE-2015 participants and hope that you find the workshop stimulating and interesting for your research and professional activities.

Organising Committee:
Maria Bermudez-Edo, University of Surrey
Payam Barnaghi, University of Surrey
Koji Zettsu, NICT
Schahram Dustdar. Vienna University of Technology

Technical Program Committee:
Rajendra Akerkar, Vestlandsforsking -Sogndal
Konstantinos Vandikas, Ericsson
Oscar Corcho, Universidad Politécnica de Madrid
Jean-Paul Calbimonte, EPFL
Sefki Kolozali, University of Surrey
Minh S Dao, NICT
Bin Guo, Northwestern Polytechnical University
Kerry Taylor, CSIRO ICT Centre -Canberra
Herwig Schreiner, Siemens
Cosmin-Septimiu Nechifor, Siemens
Maria Visitacion Hurtado, Universidad de Granada
Alessandra Mileo, National University of Ireland in Galway
Monika Solanki, Aston University
Vlasios Tsiatsis, Ericsson
Ralf Tönjes, University of Applied Science Osnabrück
Mirko Presser, Alexandra Institute
Pramod Anantharam, Knoesis, Wright State University
Josiane Xavier Parreira, Siemens
Danh Le Phouc, DERI, National University of Ireland
Krishnaprasad Thirunarayan, Wright State University
Tope Omitola, University of Southampton
Manuel Noguera, Universidad de Granada
Huanjia Yang, Loughborough University
Athanasios Karapantelakis, Ericsson
Emanuele Della Valle, Politecnico di Milano

Program

Monday 11 May 08:45-12:00 Conference Room 3

W9: Data Analytics for Dynamic Environments

Chair: Maria Bermudez, University of Surrey, United Kingdom

1 Keynote: From Big Data to Context-Aware Service
Prof Ralf Toenjes, University of Aplied Sciences Osnabruesk

2 Prescriptive Analytics based Automatic Networking or Urban Stream Services Provisioning
Septimiu Nechifor, Dan Puiu, Bogdan Târnauca, Siemens Corporate Technology; Florin Moldoveanu, Transilvania University of Brasov

3 Probabilistic KNN: A novel Algorithm for Passive Indoor-location Scenario
Lei Yang, Hao Chen, Qimei Cui, Xuan Fu, Yifan Zhan, Beijing University of Post and Telecommunication

4 A new Adaptative Probabilistic Broadcast Protocol for Vehicular Networks
Ahmed Al-Dubai, Edinburgh Napier University; Mustafa Bani Khalaf, Jadara University; Wajeb Gharibi, Jazan University; Jamal Ouenniche, University of Edinburgh

4 **Vehicle Recognition using Acoustic Sensor Networks in Complex Scenes via Multiple Kernel Sparse Representation**
Kangyan Wang, Rui Wang, Yutian Feng, Yue Zhen, Shangai University

5 **Performance Evaluation of OpenID Connect for an Information Marketplace**
Kostantinos Vandikas, Vlasios Tsiatsis, Ericsson AB; Alberto Blazquez, Upsala University

W10: International Workshop on Global and Social Resource Sharing in/through Wireless Networks (ResourceWirelessNet)

It is predicted that in 2020 and beyond there will be hundredbillions of heterogeneous devices relying on cellular networks for data exchanges.The number of devices and traffic volumeare expected to increase a thousand-fold(e.g., 100 Gbps/km2and 500 Gb/user/month according to thefifth generation(5G)flagship project METIS). The capabilities offered by fourth generation (4G) networks, currentlybeing deployed worldwide, where each device is capable of achieving data rates from the order ofhundredsMbpsto several Gbps, will not be enough to service the projected amount of connected devicesand traffic volumein future wireless networks.Thetransmission capacity is largely limited by the offered bandwidth, enjoyed signal strength, and suffered interference. Hence, to to substantiallyenhance the spectrum efficiency,diverse technologieshave been widely discussed forco-channel/cooperativedeployment including heterogeneous small cells, device-to-device (D2D) communications, machine-to-machine (LTE-M) communications, Licensed Assisted LTE access (LAA), IEEE 802.11af, IEEE 802.11u, and cloud radio access networks (C-RAN). Nevertheless, enhancing the spectrum efficiency is only one of the corerequirementsin the future system design. To suggest equal enhancements in network efficiency, energy efficiencyinformation management capability, universal service, and user experiences, it is challenged to developtechnologies of ubiquitous"resource sharing" including energy, computing/processingcapability, memory/storage ,and information/database, required to be sharedamong devices and networks globally and socially. To be able to address aboveunprecedented challengesfor future wireless networks, we should explore allthe frontiers of human knowledge and potential technologies. This is the motivation toenvision the next generation paradigmsof communications, networks, computing, information dissemination, data storage/processing, and energy harvesting in terms of fundamentaltheories, emerging technologies, innovative system architecture/protocol/algorithm designs. Considering thelimited time left to tackle these critical challenges, it is nowtime to move forward.The purpose of this workshop is consequently to bringtogetherstate-of-the-art innovations, research activities (both in academia and industry), and the corresponding standardizationimpacts, so to understand the inspirations, requirements,and the promising technical options to boost and enrich human's activitiesin future wireless networks.

Organising Committee:
Shao-Yu Lien, National Formosa University
Shin-Ming Cheng, National Taiwan University of Science and Technology
Jemin Lee, Singapore University of Technology and Design
Neeli R. Prasad, Aalborg University

Technical Program Committee:
Po-Hsuan Tseng, National Taipei University of Technology
Fan-Shuo Tseng, National Sun Yat-sen University
Liangzhong Ruan, Massachusetts Institute of Technology
Santiago Mazuelas, Qualcomm
Michail Matthaios, Queen's University Belfast
Matthias Wildemeersch, International Institute for Applied Systems Analysis
Trung Q. Duong, Queen's University Belfast
Jin Gon Joung, Institute for Infocomm Research
Jue Wang, Singapore University of Technology and Design
Yuan Shen, Tsinghua University
Fanggang Wang, Beijing Jiaotong University

Program

Monday 11 May 13:30-17:00 Conference Room 3
Chair: Shao-Yu Lien, National Formosa University, Taiwan

1 **Keynote Speech 1**
Lajos Hanzo, University of Southampton

2 **Divisible Load Scheduling in Mobile Grid based on Stackelberg Pricing Game**
Jiadi Chen, Qiang Zheng, Hang Long, Wenbo Wang, Beijing University of Posts and Telecommunications

3 **Joint Relay Beamforming and Source Receiving in MIMO Two-Way AF Relay Network with Energy Harvesting**
Yancun Chen, Zhigang Wen, Beijing University of Posts and Telecommunications; Shuai Wang, The University of Hong Kong; Juanjuan Sun, Min Li, Beijing University of Posts and Telecommunications

4 **Spectrum Allocation in Two-Tier Heterogeneous Network: A Bilateral Negotiation Framework**
Yang Yan, Yunzhou Li, Chunxiao Xing, Jing Wang, Tsinghua University

5 **Keynote Speech 2**
Mohammad Shikh-Bahaei, King's College London

W11: Heterogeneous Networking for the Internet of Things

The Internet of Things will span from WSAN (Wireless Sensor and Actuator Networks), and M2M communication, to security frameworks and service models, while next generation wireless access networks will be composed of flexible, multi-tier, and scalable heterogeneous architectures, incorporating small cells, offloading techniques, and optimized protocols for cellular IoT. Thus, an important challenge in future wireless communications is how to design and run cost efficient networks that optimize the key performance indicators to support the requirements of these services. The Workshop on Heterogeneous Networking for the Internet of Things brings together researchers focusing on resource

management and optimization within the context of heterogeneous wireless networking. The scope of this workshop organized by the MESH-WISE and RERUM EU-FP7 projects lies in the communication aspects, key technologies, algorithms, and protocols in HetNets enabling IoT, with a focus on M2M communications and offloading, as well as IoT-enabled services, with a special interest on Intelligent Transportation System (ITS).

General Chair:
Björn Landfeldt, Lund University

Technical Program Committee:
Chairs:
Antonio Capone, Politecnico Di Milano
Di Yuan, Linköping University

Apostolos Destounis, Huawei
Azzedine Boukerche, University of Ottawa
George Oikonomou, University of Bristol
Ilaria Malanchini, Bell Labs Alcatel Lucent
Jonathan Chan, NICTA
Marian Codreanu, Oulu University
Marius Portmann, University of Queensland
Matteo Cesana, Politecnico di Milano
Tao Han, Huazhong University of Science and Technology
Vangelis Angelakis, Linköping University

Poster & Demo Sessions Chairs:
Emma Fitzgerald, Lund University
Nikolaos Pappas, Linköping University

Publicity Chair:
Elias Z. Tragos, FORTH-ICS

Program

Monday 11 May 09:00-09:45 Conference Room 7
Keynote
Heterogeneous Networking for IoT
Björn Ekelund, Ericsson Research, Sweden

Monday 11 May 10:00-10:45 Conference Room 7
Mesh-Wise & RERUM FP7 projects Demonstrations Session

Monday 11 May 10:45-12:00 Conference Room 7
Session I

1 **Empowering the IoT Heterogeneous Wireless Networking with Software Defined Radio**
Manolis Surligas, Antonis Makrogiannakis, Stefanos Papadakis, FORTH, Institute of Computer Science

2 **Energy-Efficient Fault-Tolerant Dynamic Event Region Detection in Wireless Sensor Networks**
Hans-Jacob Enemark, DTU Compute; Yue Zhang, East China Normal University; Nicola Dragoni, Technical University of Denmark; Charalampos Orfanidis, Uppsala University

3 **Rate-adaptive compressive sensing for IoT applications**
Pavlos Charalampidis, Alexandros Fragkiadakis, Elias Tragos, FORTH, Institute of Computer Science

4 **Cooperative Wireless Networking with Probabilistic On/Off Relaying**
Ioannis Avgouleas, Nikolaos Pappas, Vangelis Angelakis, Linköping University

Monday 11 May 13:30-14:30 Conference Room 7
Session II

1 **Mathematical Programming Approach to Task Offloading in Visual Sensor Networks**
Alessandro Enrico Redondi, Matteo Cesana, Luca Baroffio, and Marco Tagliasacchi, Politecnico di Milano

2 **Cluster-based WSN Routing Protocol for Smart Buildings**
Hnin Yu Shwe and Peter Han Joo Chong, Nanyang Technology Universit

3 **Impact of Neighbor Awareness at the MAC Layer in a Vehicular Ad-Hoc Network (VANET)**
Imran Khan, Telcom SudParis; Mohammad Aazam Kyung Hee University; Noel Crespi Telcom SudParis

Monday 11 May 14:30-15:15 Conference Room 7
Mesh-Wise & RERUM FP7 projects Posters

Monday 11 May 15:15-16:45 Conference Room 7
Panel Session
Networking and data in smart city IoT use cases: challenges and opportunities

W12: International Workshop on Service-Oriented Computing in Disconnected, Intermittent and Limited (DIL) Networks (SOC-DIL)

Service-oriented computing (SOC) has emerged in recent years as a promising approach to facilitating the interoperability of various, generally heterogeneous networking systems. After successful deployment in the Internet and broadband networks, the latest trend is to introduce SOC into Disconnected, Intermittent and Limited (DIL) wireless/mobile networking environments, which are typical scenarios for rural area networks, vehicular networks, battlefield networks and other resource-constrained or disadvantaged networks. Efficient and effective interoperability in these networks is highly demanded for various mission-critical application scenarios such as disaster relief in ravaged regions, search and rescue in remote areas and military/tactical operations in hostile environments. The workshop is therefore primarily concerned with latest research advances in improving the performance of SOC-based services and applications in DIL networks. The workshop welcomes all the stakeholders concerned with all aspects of innovative design, implementation, deployment, evaluation and recommendation of SOC-based systems in DIL environments.

Organising Committee:
General Co-chairs
Frank T. Johnsen, Norwegian Defence Research Establishment
Trude H. Bloebaum, Norwegian Defence Research Establishment
Qi Wang, University of the West of Scotland

Technical Program Co-chairs
Christos Grecos, Independent Imaging Consultant
Jose M. Alcaraz Calero, University of the West of Scotland

Publicity Co-chairs
Lingfen Sun, University of Plymouth
Ian Owens, Cranfield University
Panel Chair
Peter-Paul Meiler, Netherlands Organisation for Applied Scientific Research

Technical Program Committee:
Jose M. Alcaraz Calero, University of the West of Scotland
Christoph Barz, Fraunhofer FKIE

Thomas Chen, City University London
Frank Eliassen, University of Oslo
Joakim Flathagen, Norwegian Defence Research Establishment
Ansgar Gerlicher, Stuttgart Media University
Swee Keow Goo, University of Glasgow
Øyvind Kure, Norwegian University of Science and Technology
Carsten Griwodz, Simula Research Laboratory
Jens-Uwe Hahn, Stuttgart Media University
Jia Hu, Liverpool Hope University
Wim Huiskamp, Netherlands Organisation for Applied Scientific Research (TNO)
Norman Jansen, Fraunhofer FKIE
Bartosz Jasiul, Military Communications Institute (MCI)
Paweł Kaniewski, Military Communications Institute (MCI)
Kevin Chan, Army Research Laboratory
Kai von Luck, Hamburg University of Applied Sciences
Ketil Lund, Norwegian Defence Research Establishment (FFI)
Marco Manso, Rinicom
Ian Owens, Cranfield Defence and Security
Gregorio Martinez Perez, University of Murcia
Rafał Piotrowski, Military Communications Institute
Utz Roedig, Lancaster University
Joanna Śliwa, Military Communications Institute (MCI)
Lingfen Sun, University of Plymouth
Marcel D.E. van der Lee, Netherlands Organisation for Applied Scientific Research (TNO)
Jurriaan van Diggelen, Netherlands Organisation for Applied Scientific Research (TNO)
Qi Wang, University of the West of Scotland
Le Yu, University of Edinburgh
Knut Øvsthus, Bergen University College

Program

Monday 11 May 13:30-15:00 Conference Room 5

Service-Oriented Computing I

Chair: Qi Wang & Jose M. Alcaraz Calero, University of the West of Scotland, UK

1 **Keynote speech: Service-oriented computing challenges in tactical networks**
Peter-Paul Meiler, Netherlands Organisation for Applied Scientific Research (TNO)

2 **Federated single sign on in disconnected, intermittent and limited (DIL) networks**
Marianne R. Brannsten, Norwegian Defence Research Establishment (FFI)

3 **Discovery of things: A fully-distributed opportunistic approach**
Badis Djamaa, Mark Richardson, Peter Barker, Ian Owens, Cranfield University

4 **A UAV-cloud prototype system for disaster sensing applications**
Chunbo Luo, James Nightingale, University of the West of Scotland; Ekhorutomwen Asemota, Technology Services, Capgemini; Christos Grecos, Independent Image Consultant

5 **Security services efficiency in disadvantaged networks**
Joanna Śliwa, Bartosz Jasiul, Tomasz Podlasek, Robert Matyszkiel, Military Communication Institute; Jan Jach, Transbit

Monday 11 May 15:30-17:00 Conference Room 5

Service-Oriented Computing II

Chair: Frank T. Johnsen & Trude H. Bloebaum, Norwegian Defence Research Establishment, Norway

1 **Agile computing middleware support for service-oriented computing over tactical networks**
Niranjan Suri, Institute for Human & Machine Cognition; Alessandro Morelli, University of Ferrara; Jesse Kovach, Laurel Sadler, Robert Winkler, U.S. Army Research Laboratory

2 **Efficient methods of radio channel access using dynamic spectrum access that influences SOA services realization – experimental results**
Joanna Sliwa, Robert Matyszkiel, Military Communication Institute; Jan Jach, Transbit

3 **Energy-aware social-based multicast in delay-tolerant networks**
Animesh Roy, Tamaghna Acharya, Sipra DasBit, Indian Institute of Engineering Science and Technology, Shibpur

4 **The final destination: Building test bed apps for DIL environments**
Arild Bergh, Norwegian Defence Research Establishment (FFI)

5 **Panel discussion**
Chair: Peter-Paul Meiler, Netherlands Organisation for Applied Scientific Research (TNO), Netherlands;

Panellists: Ian Owens, Cranfield University; Norman Jansen, Fraunhofer; Jose Alcaraz-Calero, UWS; Marco Manso, Rinicom; Kevin Chan, US Army Research Lab; Christoph Barz, Fraunhofer; Christos Grecos, Independent

W13: International Workshop on Integrating Communications, Control, Computing Technologies for Smart Grid (ICT4SG)

The electricity grid is facing four major challenges — increasing electricity demand, ageing grid infrastructure, ever-increasing penetration of renewables, and significant uptake of electric vehicles. To address these challenges, it is of vital importance to integrate modern control, communication, and computing technologies into one of the most complicated systems on earth, the electricity grid, for building a self-directed and self-healing smart grid.

The realization of the smart grid will require collaborative and sustained efforts from the Societies of Power Electronics, Power & Energy, Control, Communication, and Computing over the years to come. This workshop aims to facilitate this sustained effort and enhance international collaborations by disseminating cutting-edge research results spanning multiple disciplines. Participants will be able to share perspectives and the newest findings from research and ongoing projects relevant to smart grid. This will include a variety of smart grid applications and technologies, such as smart metering, demand side management, renewable energy integration, advanced control, communication, and computing technologies.

Organising Committee:

Hongjian Sun, Durham University
Wei-yu Chiu, Yuan Ze University
Bill Lichtensteiger, Landis+Gyr
Husheng Li, University of Tennessee
John Thompson, Edinburgh University

Technical Program Committee:

Albert Y.S. Lam, Hong Kong Baptist University
Bo Tan, Bristol University
Chao-Kai Wen, National Sun Yat-Sen University
Chao Wang, Tongji University
Chian-Song Chiu, Chung Yuan Christian University

F. Richard Yu, Carleton University
Haijun Zhang, The University of British Columbia
Huiqin Du, JiNan University
Jie Ding, Yangzhou University
Lei Wang, University of Newcastle
Sikai Huang, University of Strathclyde
Xinshan Zhu, Tianjin University
Yiwei Fang, Fujitsu Research Lab
Xiaoli Chu, Sheffield University
Shancang Li, University of Bristol
Nan Zhao, Dalian University of Technology

Program

Monday 11 May 2015, 13:30-17:00 Conference Room 6

Integrating Communications, Control, Computing Technologies for Smart Grid (ICT4SG)

Chair: Hongjian Sun, Durham University, U.K.

1 **Keynote Speech: Smart Grid Technologies**
Andy Stanford-Clark, IBM

2 **Privacy Aware Demand Response and Smart Metering**
Abdalkarim Awad, Peter Bazan, Reinhard German, University of Erlangen-Nuremberg

3 **Implementation of a Transparent Power Information System on Campus Using Existing Infrastructures**
Jui-Ting Hsieh, Wei-Yu Chiu, Yuan Ze University

4 **Analysis of Information Quality in event triggered Smart Grid Control**
Thomas le Fevre Kristensen, Rasmus L. Olsen, Jakob G. Rasmussen, Aalborg University

5 **Sun tracker – Design, build and test**
Weibo Liu, University of Liverpool

6 **Keynote Speech: An Overview of Smart Grid Communications Research at Edinburgh**
John S. Thompson, Edinburgh University

7 **A load balancing algorithm for EV static and dynamic wireless charging**
Theodoros Theodoropoulos, Angelos Amditis, Yannis Damousis, ICCS

8 **Wireless Power Transfer: Survey and Roadmap**
Xiaolin Mou, Hongjian Sun, Durham University

W14: DUPLO Workshop on Full-Duplex Radios and Systems

The foreseen huge growth in mobile and wireless traffic volume and number of wirelessly connected devices by 2020 call for new innovative solutions that can exploit the finite radio resources more efficiently. Full-duplex wireless transmission, where a node can send and receive at the same time in the same frequency band, opens new possibilities for improving wireless communication system performance. The full-duplex transmission paradigm has several potential use cases in wireless networks, including e.g., backhaul connections, relays, and connections between base stations and devices. However, the paradigm sets challenges to wireless transceiver implementation due to very large self-interference cancellation requirement in the full-duplex transceiver. Successful solving of the implementation challenges paves path for introducing full-duplex transmission paradigm to future 5G systems.

This workshop will look at latest advances in research and development of novel full-duplex transceiver solutions and system applications and discuss applicability of the technology for future evolution of wireless communications systems.

Organising Committee:
Bram Nauta, University of Twente
Kari Rikkinen, University of Oulu
Technical Program Committee:
Achaleshwar Sahai, Qualcomm Inc
Ahmed Eltawil, UC Irvine
Alex Gong, Loughborough University
Amir Khandani, University of Waterloo
Ashutosh Sabharwal, Rice University
Björn Debaillie, IMEC
Cristina Lavin, TTI
Dirk Jan van den Broek, University of Twente
Guillaume Villemaud, Insa Lyon
Jawad Seddar, Thales
Marcos Katz, University of Oulu
Mikko Valkama, Tampere University of Technology
Mir Ghoraishi, University of Surrey
Risto Wichman, Aalto University
Sofie Pollin, KUL, Leuven
Vaneet Aggarwal, AT&T Research
Visa Tapio, University of Oulu
Wilhelm Keusgen, Fraunhofer HHI

Program

Monday 11 May 8:30-10:10 Conference Room 2

Full-Duplex Transmission in Wireless Networks

Chair: Kari Rikkinen, University of Oulu

1 **Full-duplex self-backhauling for small-cell 5G networks (Invited Paper)**
Risto Wichman, Aalto University

2 **Hybrid Half- and Full-Duplex Communications Under Correlated Lognormal Shadowing**
Carlos Lima, Sao Paulo State University (UNESP); Hirley Alves, Pedro Nardelli, Matti Latva-aho, University of Oulu

3 **Game Theory Based Radio Resource Allocation for Full-Duplex Systems**
Mohammed Al-Imari, Mir Ghoraishi, Pei Xiao, Rahim Tafazolli, University of Surrey

Monday 11 May 10:30-12:00 Conference Room 2

Full-Duplex Transceiver

Chair: Mir Ghoraishi, University of Surrey

1 **Recent Developments in Fully-Integrated RF Self-Interference Cancellation for Frequency-Division- and Full-Duplex Radios**
Jin Zhou, Harish Krishnaswamy, Columbia University

2 **RF Self-Interference Reduction Techniques for Compact Full Duplex Radios**
Björn Debaillie, Barend van Liempd, Jan Craninckx, IMEC; Dirk Jan van den Broek, Eric Klumperink, Bram Nauta, University of Twente; Cristina Lavin, Carmen Palacios, TTI

3 **A Widely Tunable Full Duplex Tranceiver Combining Electrical Balance Isolation and Analog Cancellation**
Leo Laughlin, Chunqing Zhang, Mark Beach, Kevin Morris, University of Bristol; John Haine/u-blox

Monday 11May 13:30-15:00 Conference Room 2

Full-Duplex Transceiver and System Solutions

Chair: Mir Ghoraishi, University of Surrey

1 **Wideband Self-Adaptive RF Cancellation Circuit for Full-Duplex Radio: Operating Principle and Measurements**
Timo Huusari, Petteri Liikkanen, Dani Korpi, Mikko Valkama, Tampere University of Technology; Yang-Seok Choi, Shilpa Talwar, Intel Corp

2 **Full-Duplex Relaying Systems Subject to Co-channel Interference and Noise in Nakagami-m Fading**
Hirley Alves, Matti Latva-aho, University of Oulu; Richard Demo Souza, Federal University of Technology – Parana (UTFPR); Daniel Benevides da Costa, Federal University of Ceara (UFC)

3 **System-level Performance of In-Band Full-Duplex Relaying on M2M Systems at 920 MHz**
Sathya Narayana Venkatasubramanian, Katsuyuki Haneda, Aalto University; Koji Yamamoto, Kyoto University

Monday 11 May 15:30-17:00 Conference Room 2

Panel: The feasibility of full-duplex technology as the solution for future 5G systems'

Chair: Kari Rikkinen, University of Oulu

W16: Workshop on 5G New Air Interface

The next generation (5G) cellular technology is expected to arrive in 2020. There are four trends indicating the need for a new generation of cellular technology including new air interface:

- The demand for wireless data is predicted to increase significantly, resulting in 1000x higher mobile data volumes and 10-100x higher end user data rates.
- The number of connected devices is predicted to increase by a factor of 10-100, which means that up to 300,000 devices need to be served per access point.
- Wireless connectivity will be applied to new use cases that require very reliable connections and mission-critical communication, such as vehicle-to-vehicle coordination, critical control of the power grid, etc.
- Remote presence and tactile Internet that impose stringent latency constraints on the overall connection, including the wireless part of it. Forecasts imply that the latency should be decreased for a factor of 5 in order to enable such services.

The air interfaces for 2G, 3G, and 4G were all designed for specific use cases (limited only to to voice and data communications) with a certain number of limited KPIs in mind (throughput, capacity, dropped/blocked call rates, etc.). However, as outlined above, 5G requires the support of a much broader class of services and consequently a very diverse family of devices and traffic characteristics.

The scope of the workshop is to contribute to the design of a new 5G air interface taking specifically the above application constraints into account. An important subject of the workshop is the feasibility of a single *golden air interface* able to support these requirements in a highly flexible manner.

Organising Committee:
Franck Schaich, Alcatel-Lucent, Germany
Berna Sayrac, Orange, France
Martin Schubert, Huawei, Germany
Gerhard Wunder, Fraunhofer HHI, Germany

Program

Monday 11 May 8:30-10:00 Conference Room 1

5G New Air Interface

1 **Keynote: The FANTASTIC 5G Project**
Frank Schaich, Alcatel-Lucent

2 **Keynote: 5G Air Interface Options**
Rahim Tafazolli, University of Surrey

Monday 11 May 10:30-12:00 Conference Room 1

5G New Air Interface

Chair: Thorsten Wild

1 **Compressive Sensing Multi-User Detection for Multicarrier Systems in sporadic Machine Type Communication**
Fabian Monsees, Matthias Woltering, Carsten Bockelmann, Armin Dekorsy, University of Bremen

2 **Derandomized Multi-block Sign Selection for PMEPR Reduction of FBMC Waveform**
Saeed Afrasiabi Gorgani, Technische Universität Berlin; Gerhard Wunder, Technische Universität Berlin/Fraunhofer HHI

3 **Large-scale Multi-user Distributed Antenna System for 5G Wireless Communications**
Dongming Wang, Zhenling Zhao, Yuqi Huang, Hao Wei, Xiangyang Wang, Xiaohu You, Southeast University

4 **Industry talk: Flexible Air Interface Design Based on New Waveforms**
Martin Schubert, Huawei

5 **Industry talk: Air interface evolution towards 5G**
Klaus Pedersen, Nokia Networks

Monday 11 May 13:30-15:00 Conference Room 1

5G New Air Interface

Chair: Thorsten Wild

1 **A Leaner Carrier for the New 5G Air Interface**
Kilian Roth, Technical University Munich; Cecilia Carbonelli, Infineon, Germany; Michael Faerber, Intel Mobile Communications, Germany; Josef A. Nossek, Technical University Munich

2 **Resource Allocation in Downlink Non-orthogonal Multiple Access (NOMA) for Future Radio Access**
Joumana Farah, Lebanese University; Marie-Rita Hojeij, Holy-Spirit University of Kaslik; Charbel Abdel-Nour, Catherine Douillard, Telecom Bretagne

3 **An Advanced Hardware Platform to verify 5G Communication Concepts**
Thomas Wirth, Thomas Haustein, Fraunhofer Heinrich Hertz Institute

4 **Industry talk: Samsung 5G Vision**
Maziar Nekovee, Samsung

5 **Industry talk: 5G The Orange Vision**
Orange

W17: TV White Spaces for Broadband Wireless – Glasgow Pilot Event

Broadband connectivity is fundamental to business and society, but not all are yet able to enjoy it. The Glasgow Pilot sought to evaluate the effectiveness of new dynamic spectrum sharing technology, in supporting the Scottish Government's objective to achieve world-class connectivity by 2020. This is as important for rural communities as it is for thriving hubs such as Glasgow.

This event, aimed at policy makers, community representatives and industry, provides a valuable briefing on the potential of TV white spaces to enable improved broadband connectivity and to support innovation towards greater sustainability of urban and rural communities. It will showcase results from the Glasgow Pilot, as well as related developments worldwide.

Program

Thursday 14 May 9:30-10:40 Executive AB

Session 1

Welcome and overview of the day
Bob Stewart, University of Strathclyde

Keynote

1 **What are white spaces and dynamic spectrum access? Why do they matter?**
Andrew Stirling, Larkhill

2 **Geolocation Databases – a powerful new tool for policymakers?**
Heikki Kokkinen, Fairspectrum

Thursday 14 May 11:10-12:00 Executive AB

The Glasgow White Spaces Pilot

1 **Isle of Bute TVWS Testbed**
David Crawford, University of Strathclyde

2 **Overview of the Glasgow TVWS Pilot Phase 1**
David Crawford, University of Strathclyde

3 **Overview of the TVWS Pilot and finalisation of the regulatory framework**
Ofcom Scotland

Thursday 14 May 13:30-14:00 Executive AB

Marine potential of TVWS

1 **Internet on the Orkney ferries**
Greg Whitton, Cloudnet

2 **Results from the Orkney Ferries Pilot**
Bob Willmot, BAE Systems Maritime

3 **White Space On the PS Waverley**
Andrew Stiring, Larkhill Consulting

Thursday 14 May 14:00-14:20 Executive AB

White Spaces worldwide

Highlights from the DSA Summit 2015 and global outlook for dynamic spectrum sharing and the TV white spaces
Jim Beveridge, Microsoft; Malcolm Brew, Mawingu

Thursday 14 May 14:20-15:00 Executive AB

Super Wi-Fi, using white spaces

Implications for wireless home and office networks, drawing on results of tests with the world's first triple-band Wi-Fi (802.11af) devices
CWSC, Sky, Mediatek, 6H

Thursday 14 May 15:30-16:30 Executive AB

Smart cities, smart rural and smart transport

Automotive applications

Potential impact on urban and rural communities across the country

Rural health service connectivity—challenges & opportunities
Andrew Inglis, NHS Greater Glasgow & Clyde)

eHealth developments
Microsoft

Smart Tourism – rural sports – connectivity to support growth
David Crawford, University of Strathclyde; Andrew Stirling, Larkhill

Thursday 14 May 16:30-17:00 Executive AB

Next steps—where next for TV White Spaces

Industry Sessions

To emphasize linkages with research and industry, VTC2015-Spring offers a day-long event to instruct on leading industrial techniques, delivered by our technological partners in industry. All VTC and Thursday One-Day registrants are invited to attend. Due to equipment limitations, registration is required for the NI workshop; details on their exhibit.

Thursday 14 May 2015, 10:30–12:00

MathWorks Platform for Next Generation Wireless System Development

MathWorks Industrial Design Session

Bob Stewart, University of Strathclyde, Glasgow, UK

In this session we will present recent advances in MATLAB and Simulink software and hardware support for the design of LTE and 5G mobile applications, software defined radio (SDR) systems, and advanced vehicular technologies such as radar-based driver assistance systems. The design flows presented in this session will use the functionality of MathWorks communications system design products for MIMO-OFDM system design, live signal generation and analysis with SDR hardware, HDL code generation of fixed-point designs for FPGA implementation. The session also features a keynote on Model-Based Design of vehicular technologies for the connected car equipped with mobile and wireless communications, environment sensing, and active driver assistance systems – technologies that will help lead to the era of autonomous systems that can sense, navigate, and communicate.

Thursday 14 May 2015, 13:30–17:00 Conference Room 3

Rapid Prototyping of Real-Time Wireless Systems with NI LabVIEW Communications System Design Suite

National Instruments Industrial Design Workshop

Sanjay Challa,Product Manager for Embedded Software at National Instruments

In today's competitive wireless research space, the ability to prototype ideas quickly on hardware using real signals is more important than ever. Attendees will gain hands-on experience with National Instruments' integrated hardware and software platform for rapid prototyping of real-time wireless systems using the NI LabVIEW Communications System Design Suite (LabVIEW Communications) and the NI USRP RIO FPGA-based software defined radio. The final result will be the attendee's ability to design, simulate, and prototype a 5-MHz LTE-based real-time OFDM link on a high performance FPGA, and transmit data over the air using the link designed on the NI USRP RIO. This session will cover the most important aspects of the idea-to-prototype flow in a single tool, including floating-point simulation, floating-point to fixed-point conversion, HW/SW partitioning, performance-complexity tradeoffs, and finally verification and testing on an FPGA-based software-defined radio.

VTC2015-Spring Technical Program
Tuesday 12 May 2015

Tuesday, 12 May 2015 11:00-12:30 Conference Room 1

1A: M2M Communications

Chair: Chung Shue (Calvin) Chen, Alcatel-Lucent Bell Labs

1 BAT: A Balanced Alternating Technique for M2M Uplink Scheduling over LTE
Ahmed Elhamy, Yasser Gadallah, The American University in Cairo

2 Class Based Overall Priority Scheduling for M2M Communications over LTE Networks
Beichen Chen, Toshiba; Zhong Fan, Toshiba Research Laboratory; Fengming Cao, Toshiba Research Europe; George Oikonomou, Theo Tryfonas, University of Bristol

3 Distributed Admission Control with Soft Resource Allocation for Hybrid MAC in Home M2M Networks
Xiaobo Yu, Huawei Technologies Co., Ltd; Pirabakaran Navaratnam, Klaus Moessner, University of Surrey; Shuiping Long, Huawei Technologies Co., Ltd

4 Joint Optimization of Clustering and Scheduling for Machine-to-Machine Communications in Cellular Wireless Networks
Hung-Yun Hsieh, National Taiwan University

5 Signal Processing Implementation of Virtual Carrier for Supporting M2M Systems Based on LTE
Shendi Wang, John Thompson, University of Edinburgh

Tuesday, 12 May 2015 11:00-12:30 Conference Room 2

1B: Channel Measurement, Characterization and Modeling I

Chair: Ruisi He, Beijing Jiaotong University

1 A Method for Generating Correlated Taps in Stochastic Vehicle-to-Vehicle Channel Models
Yan Li, Bo Ai, Beijing Jiaotong University; David Michelson, The University of British Columbia; Siyu Lin, Qi Wang, Zhangdui Zhong, Beijing Jiaotong University

2 Geometrical Cluster-based Scatterer Detection Method with the Movement of Mobile Terminal
Fengyu Luan, Tsinghua University; Andreas F. Molisch, University of Southern California; Limin Xiao, Tsinghua University; Fredrik Tufvesson, Lund University; Shidong Zhou, Tsinghua University

3 Material Characterisation for Short Range Indoor Environment in the Millimetre Wave Bands
Ainor Khaliah Mohd Isa, Geoffrey Hilton, Andrew Nix, University of Bristol

4 Path Loss and Throughput Estimation Models for an IEEE 802.11af Prototype
Hirokazu Sawada, Keiichi Mizutani, Kentaro Ishizu, Takeshi Matsumura, Ha-Nguyen Tran, Homare Murakami, National Institute of Information and Communications Technology; Fumihide Kojima, NICT; Hiroshi Harada, Kyoto University

5 Prediction of Delay Spread Using Ray Tracing and Game Engine Based on Measurement
Andres Navarro, Universidad Icesi; Dinael Guevara, Francisco de Paula Santander University; Jorge Gomez, Universidad del Magdalena

Tuesday, 12 May 2015 11:00-12:30 Conference Room 3

1C: Performance Evaluation of Wireless Networks

Chair: Mathini Sellathurai, Heriot Watt University

1 A Throughput Study of White-Fi Networks in Rural Environment Under Realistic Conditions and Mobility
Reham Almesaeed, Nor Fadzilah Abdullah, Angela Doufexi, Andrew Nix, University of Bristol

2 IEEE 802.11af Indoor Experiment in UK Ofcom TVWS Trial Pilot Program
Keiichi Mizutani, Kentaro Ishizu, Takeshi Matsumura, National Institute of Information and Communications Technology; Ha-Nguyen Tran, Self; Hirokazu Sawada, Homare Murakami, Fumihide Kojima, National Institute of Information and Communications Technology; Hiroshi Harada, Kyoto University

3 On the Approximation of Coverage Probability in Broadcast Single-Frequency Networks
Ahmad Awada, Lauri Kuru, Nokia

4 Downlink Performance Analysis of LTE and WiFi Coexistence in Unlicensed Band with a Simple Listen-before-talk Scheme
Cheng Chen, Northwestern University; Rapeepat Ratasuk, Amitava Ghosh, Nokia Networks

5 Fuzzy Logic Resource Allocator for Wireless Video Transmission in LTE System
Yongqiang Fei, Yuping Zhao, Dou li, Peking University

Tuesday, 12 May 2015 11:00-12:30 Conference Room 6

1D: Energy Efficiency & Harvesting

Chair: Won-Yong Shin, Dankook University

1 Renewable Energy Usage in the Context of Energy-Efficient Mobile Network
Hussein Al Haj Hassan, Telecom Bretagne; Arshad Ali, The University of Lahore; Loutfi Nuaymi, Telecom Bretagne; Salah Eddine Elayoubi, Orange Labs

2 Renewable-Powered Base Stations with Time-of-Use and Consumption-Based Block Pricing
Johann Leithon, Teng Joon Lim, National University of Singapore; Sumei Sun, Institute for Infocomm Research

3 Distributed Uplink Power Control for Energy Harvesting Wireless Networks
Guo Ao, Li Chen, Huarui Yin, WeiDong Wang, University of Science and Technology of China

4 Capacity-and-Energy Efficient Resource Allocation for Emergency Communications
Cheng Guo, Liqiang Zhao, Xidian University; Fumiyuki Adachi, Tohoku University; Guowei Fan, Xidian University

5 Energy-Efficient Scheduling Mechanism for Indoor Wireless Sensor Networks
Tianqi Yu, Auon Akhtar, Abdallah Shami, Xianbin Wang, The University of Western Ontario

Tuesday, 12 May 2015 11:00-12:30 Conference Room 7

1E: RF Design and Evaluation

Chair: Alexandru Tatomirescu, Aalborg University

1 Design and Evaluation of Frequency-Agile Multi-Standard Direct RF Digitizing Receivers for Automotive Use
Adrian Posselt, Dominic Berges, BMW Group Research and Technology; Oliver Klemp, BMW Forschung und Technik GmbH; Bernd Geck, Leibniz Universität Hannover

2 Digital Predistortion for Power Amplifiers in Hybrid MIMO Systems with Antenna Subarrays
Sangil Lee, Minhyun Kim, Youngwook Sirl, KAIST; Eui-Rim Jeong, Soonil Hong, Hanbat National University; Seongjin Kim, Yong H. Lee, Korea Advanced Institute of Science and Technology

3 A Novel Gain, Phase and Offset Calibration Scheme for Wideband Direct-Conversion Transmitters
Ashish Khandelwal, Ankur Verma, Texas Instruments

4 CLAP: Chip-Level Augmentation of IEEE 802.15.4 PHY for Error-Intolerant WSN Communication
Filip Barac, Mikael Gidlund, Tingting Zhang, Mid Sweden University

5 Widely Linear Estimation of Oscillator Phase Noise with Rank Reduction
Aamir Ishaque, Gerd Ascheid, RWTH Aachen University

Tuesday, 12 May 2015 11:00-12:30 Conference Room 8

1F: Mobile Network Applications and Services

Chair: Zhengguo Sheng, University of Sussex

1 **A Threshold Blind Digital Signature Scheme Using Elliptic Curve Dlog-Based Cryptosystem**
Hisham Dahshan, Alaa Rohiem, Ahmed Kamal, Military Technical College

2 **Mobile Application for Automatic Accident Detection and Multimodal Alert**
Joaquim Ferreira, Bruno Fernandes, Vitor Gomes, Arnaldo Oliveira, University of Aveiro

3 **VADA: Wi-Fi Direct Based Voluntary Advertisement Dissemination Algorithm for Social Commerce Service**
Junseon Kim, Howon Lee, Hankyong National University

4 **Multipath TCP Architecture for Infotainment Multimedia Applications in Vehicular Networks**
Sergi Reñé, Universitat Politècnica de Catalunya; Ernesto Expósito, CNRS-LAAS Toulouse, INSA Toulouse; Mathieu Gineste, Thales Alenia Space; Juanjo Alins, Oscar Esparza, Universitat Politècnica de Catalunya

5 **The Diversity and Scale Matter: Ubiquitous Transportation Mode Detection using Single Cell Tower Information**
Moustafa Youssef, Ali Mohamed Abdel Aziz, Egypt-Japan University of Science and Technology (E-JUST)

Tuesday, 12 May 2015 11:00-12:30 Conference Room 4/5

1P: Spectrum Efficient Management, Sensing and Cognitive Radio

1 **Performance of Cognitive Hybrid Automatic Repeat reQuest: Stop-and-Wait**
Ateeq Ur Rehman, Lie-Liang Yang, Lajos Hanzo, University of Southampton

2 **Access Point Initiated Approach for Interfered Node Detection in 802.11 WLANs**
Hiroshi Fujita, Kazyuki Ozaki, Yun Wen, Fujitsu Laboratories Ltd; Yasuharu Amezawa, Chikara Kojima, Hideyuki Kobayashi, Mobile Techno Corp.

3 **Spread Spectrum-based Coordination Design for Multi-hop Spectrum-agile Wireless Networks**
Haythem Bany Salameh, Yarmouk University

4 **Decentralized OFDMA Wireless System with Multiuser Diversity Allocation**
Guanyu Zhang, Simon Armour, Joe McGeehan, University of Bristol

5 **Spectrum Leasing in Cognitive Radio Networks: A Matching Theory approach**
Stavroula Vassaki, Marios I. Poulakis, Athanasios Panagopoulos, National Technical University of Athens

6 **Spectrum Position Sensing for Sparse Multiband Signal with Finite Rate of Innovation**
Xue Wang, Min Jia, Xuemai Gu, Harbin Institute of Technology

7 **Underlay MIMO Cognitive Radio Downlink Scheduling with Multiple Primary Users and no CSI**
Wenhao Xiong, Wichita State University; Amitav Mukherjee, Ericsson Research; Hyuck M. Kwon, Wichita State University

8 **Lower-complexity power allocation for LTE-U systems: a successive cap-limited waterfilling method**
Wenjun Xu, Boya Li, Yue Xu, Jiaru Lin, Beijing University of Posts and Telecommunications

9 **Achievable Rate and Outage Probability of Cognitive Radio with Finite-Alphabet Inputs Under Imperfect Spectrum Sensing**
Anh Duc Le, Nghi Tran, University of Akron; Sachin Shetty, Tennessee State University; Shivakumar Sastry, University of Akron

10 **An EMD-based Spectrum Sensing Technique for Cognitive Radio Networks**
Mahdi H. Al-Badrawi, Nicholas J. Kirsch, University of New Hampshire

11 **Time-Efficient Wideband Spectrum Sensing based on Compressive Sampling**
Yanbo Wang, Caili Guo, Xuekang Sun, Chunyan Feng, Beijing University of Posts and Telecommunications

12 **Single-Pixel-Camera Paradigm for Multiband Cooperative Sensing in Cognitive Radio systems**
Mouna Sghaier, Fatma Abdelkefi, Mohamed Siala, Sup'Com; Mohamed lbnkahla, Queen's University

13 **An Improved SINR Estimation Method for Heterogeneous Networks**
Tiantian Ran, Songlin Sun, Beijing University of Posts and Telecommunications; Yan Sun, Queen Mary University of London; Na Chen, Beijing University of Posts and Telecommunications

14 **Energy-Efficient Spectrum Selection and Resource Allocation in Downlink Cognitive Femtocell Networks**
Jun-Quan Chen, Jui-Hung Chu, Kai-Ten Feng, National Chiao Tung University

15 **On the Diversity Gain Region for the Relay Assisted Interference Management**
Rajendra Prasad Sirigina, A.S. Madhukumar, Nanyang Technological University

16 **Polarization Based Spectrum Sensing for Cognitive Radios in Presence of Arrival Angle**
Xiaoyu Yuan, Caili Guo, Shuo Chen, Beijing University of Posts and Telecommunications

17 **Collaborative Multi-Layer Network Coding in Hybrid Cellular Cognitive Radio Networks**
Abdallah Moubayed, King Abdullah University of Science and Technology; Sameh Sorour, King Fahd University of Petroleum and Minerals; Mohamed-Slim Alouini, Tareq Al-Naffouri, King Abdullah University of Science and Technology (KAUST)

18 **On The Maximum Likelihood Estimation for the eta-mu Fading Channel**
Fernando Palma Batista, Rausley Adriano Amaral de Souza, National Institute of Telecommunications (Inatel)

Tuesday, 12 May 2015 14:00-15:30 Conference Room 1

2A: Wireless Mesh Networks

Chair: Hisham Dahshan, Military Technical College

1 **A Game-Theoretic Approach to Supporting Fair Cooperation in Delay Tolerant Networks**
Tamer Abdelkader, Ain Shams University; Sagar Naik, University of Waterloo, Canada; Walaa Gad, Ain Shams University

2 **Area Transmission Efficiency of Single-User and Multi-User MIMO in Grid-Topology Wireless Mesh Networks**
Hironori Kusumoto, Hiraku Okada, Kentaro Kobayashi, Masaaki Katayama, Nagoya University

3 **Energy-Load Aware Routing Metric for Hybrid Wireless Mesh Networks**
Adnan Khalid, Farrukh Ali, Umair Rashid, National University of Sciences and Technology

4 **SINR based Topology Control with Fault tolerance for Multihop Wireless Networks**
Maryam Riaz, Seiamak Vahid, Klaus Moessner, University of Surrey

5 **The DTN Routing Problem: Exploitation versus Exploration of Solutions**
Jaquinei de Oliveira, Ana Cristina B. Kochem Vendramin, Anelise Munaretto, Myriam Delgado, Graduate Program in Electrical and Computer Engineering (CPGEI), UTFPR

Tuesday, 12 May 2015 14:00-15:30 Conference Room 2

2B: Channel Measurement, Characterization and Modeling II

Chair: Reiner S. Thomä, TU Ilmenau

1 Propagation Analysis with Ray Tracing Method for High Speed Trains Environment at 60 GHz
Yuyuan Chang, Masashi Furukawa, Kazuhiko Fukawa, Hiroshi Suzuki, Tokyo Institute of Technology

2 Radio Propagation Measurements and WINNER II Parameterization for a Shopping Mall at 60 GHz
Aki Karttunen, Jan Jarvelainen, Afroza Khatun, Katsuyuki Haneda, Aalto University

3 Simultanous Blind Estimation of Antenna Mutual Coupling and Direction of Arrival
Junhe Zhou, Hui Wang, Guozeng Zheng, Xiaowen Zhang, Jian Zhang, Xuefeng, Meisong Tong, Tongji University; Jian Li, Dageng Chen, Huawei Technologies

4 Ultra-Wideband Channel Sounder for Measurements at 70GHz
Robert Müller, Stephan Häfner, Diego Dupleich, Christian Schneider, Technische Universität Ilmenau; Jian Lou, Egon Schulz, Huawei Technologies Duesseldorf GmbH; Xiaofeng Lu, Chang Cao, Tianxiang Wang, Huawei Technologies Co., Ltd; Reiner Thomä, Technische Universität Ilmenau

5 A Sub-band Divided Ray Tracing Algorithm Using the DPS Subspace in UWB Indoor Scenarios
Mingming Gan, FTW; Zhinan Xu, Markus Hofer, The Telecommunications Research Center Vienna (FTW); Gerhard Steinboeck, Aalborg University; Thomas Zemen, AIT Austrian Institute of Technology

Tuesday, 12 May 2015 14:00-15:30 Conference Room 3

2C: Radio Resource Management I

Chair: Loutfi Nuaymi, Telecom Bretagne

1 Optimal SINR-based Scheduling in mmWave WPANs with Power Control and Rate Adaption
Ran Cai, Danpu Liu, Beijing University of Posts and Telecommunications; Qian Chen, Xiaoming Peng, Institute for Infocomm Research

2 An IEEE 802.16 MAC layer downlink scheduler implemented in NS3 to improve the performance of real-time and non-real-time traffic transmission
Sara Lakani, Francois Gagnon, Ecole de Technologie Superieure; Rejean Groleau, Ultra Electronics

3 Utility-Based Flexible Resource Allocation for Integrated LTE-U and LTE Wireless Systems
Jinxi Fu, Xin Zhang, Lei Cheng, Zhongyi Shen, Li Chen, Dacheng Yang, Beijing University of Posts and Telecommunications

4 UE-based Adaptive Uplink Power Control to Enhance Cell Capacity of LTE Systems
Jose Edson Vargas Bautista, Mehrzad Malmirchegini, Rao Yenamandra, Kausik Ray Chaudhuri, Qualcomm Incorporated

5 Efficient and Reliable Multicast of Data in APCO P25 Systems
Gulay Cigirkan, Tolga Girici, Melda Yuksel, TOBB University of Economics and Technology

Tuesday, 12 May 2015 14:00-15:30 Conference Room 6

2D: Energy Efficiency in MIMO & DAS

Chair: Daniel So, University of Manchester

1 Performance Analysis of Energy Efficient Distributed Antenna Systems
Mansour Aldosari, Khairi Hamdi, University of Manchester

2 Robust Beamforming and Power Splitting Design in Distributed Antenna System with SWIPT under Bounded Channel Uncertainty
Zhengyu Zhu, Zheng Zhou University; Kyoung-Jae Lee, Hanbat National University; Zhongyong Wang, Zhengzhou University; Inkyu Lee, Korea University

3 Energy Efficiency and Spectral Efficiency Trade-Off in MIMO Broadcast Channels
Jie Tang, Daniel K C So, Emad Alsusa, Khairi Hamdi, Arman Shojaeifard, University of Manchester

4 Sum Rate Maximizing in a Multi-user MIMO System with SWIPT
Zhengyu Zhu, Zheng Zhou University; Inkyu Lee, Korea University; Xin Gui, Beijing University of Posts and Telecommnications

5 The Sum-Rate Maximization Precoding for Multiuser MIMO SWIPT Systems
Zhaohui Yue, Hui Gao, Ruohan Cao, Tiejun Lv, Beijing University of Posts and Telecommunications

Tuesday, 12 May 2015 14:00-15:30 Conference Room 7

2E: Channel Coding

Chair: Rob Maunder, University of Southampton

1 Iterative Decoding of Virtual Differentially Coded OFDM Systems
Shinsuke Ibi, Seiichi Sampei, Osaka University

2 Algebraic Constructions of Quasi-Cyclic LDPC Codes Based on Prime Fields
Rui Zhang, Guixia Kang, Ningbo Zhang, Xiaoshuang Liu, Beijing University of Posts and Telecommunications; Hao Wu, TGLD Information Center

3 Performance Analysis of Time-Reversal Based Precoding Schemes in MISO-OFDM Systems
Mohamad Maaz, Maryline Helard, INSA (rennes); Philippe Mary, Ming Liu, INSA, IETR, UMR 6164 CNRS

4 Size of 1-error-detecting codes in three interactive transmissions
Zhiqing Xiao, Yunzhou Li, Limin Xiao, Jing Wang, Tsinghua University

Tuesday, 12 May 2015 14:00-15:30 Main Auditorium B

2G: Interference Management I

Chair: Thorsten Wild, Alcatel Lucent

1 An Alignment Based Interference Cancellation Scheme for Multi-cell MIMO Networks
Galymzhan Nauryzbayev, Emad Alsusa, Jie Tang, University of Manchester

2 Experimental Evaluation of Blind Interference Alignment
Máximo Morales-Céspedes, Universidad Carlos III de Madrid; Matilde Sanchez, Univ. Carlos 3, Spain; Ana García-Armada, Universidad Carlos III de Madrid

3 Interference Alignment Scheme Based on Limited Feedback for Two-Cell Interfering MIMO-MAC
Myeong-Jin Kim, Korea University; Hyun-Ho Lee, LG Electronics; Young-Chai Ko, Korea University

4 New Opportunistic Interference Alignment Schemes in MIMO Interfering Broadcast Channels
Lijun Bai, Li Hao, University of Southwest Jiaotong

Tuesday, 12 May 2015 14:00-15:30 Main Auditorium C

2H: Transmission Technologies I

Chair: Jose Monserrat, Universidad Politecnica de Valencia

1 Cyclic Prefix Overhead Reduction for Low-Latency Wireless Communications in OFDM
Javier Lorca, Telefónica I+D

2 Effect of Linearity Enhancement in A/D Conversion for Single Carrier Transmission Systems
Osamu Muta, Kyushu University; Daisuke Kanemoto, University of Yamanashi; Syota Fukushige, Hiroshi Furukawa, Kyushu University

3 Higher Order Colour Shift Keying Modulation Formats for Visible Light Communications
Ravinder Singh, Timothy O'Farrell, John David, University of Sheffield

4 A Diagonal Structure for Analog-to-information Conversion in Compressed Sampling
Chu Wang, Wenbo Xu, Jiaru Lin, Yupeng Cui, Beijing University of Posts and Telecommunication

5 A PAPR Reduction and Data Decoding for SLM based OFDM Systems Without SI
Saheed Adegbite, Scott G. McMeekin, Brian G Stewart, Glasgow Caledonian University

Tuesday, 12 May 2015 14:00-15:30 Level 1 Auditorium

2I: Opportunistic Spectrum Access and TV White Space

Chair: Mathini Sellathurai, Heriot-Watt University

1 Development and Field Experiment of White-spaces LTE Communication System in UK Digital Terrestrial TV Band
Kazuo Ibuka, Takeshi Matsumura, Kentaro Ishizu, Homare Murakami, Fumihide Kojima, Hiroshi Harada, National Institute of Information and Communications Technology; Hiroshi Harada, Kyoto University

2 Some Initial Results and Observations from a Series of Trials within the Ofcom TV White Spaces Pilot
Oliver Holland, Shuyu Ping, Nishanth Sastry, Hong Xing, Suleyman Taskafa, Adnan Aijaz, King's College London; Pravir Chawdhry, Jean-Marc Chareau, James Bishop, Michele Bavaro, Philippe Viaud, Tiziano Pinato, Emanuele Anguili, Joint Research Centre of the European Commission; Mohammad Reza Akhavan, Julie McCann, Imperial College London; Yue Frank Gao, Zhijin Qin, Qianyun Zhang, Queen Mary, University of London; Raymond Knopp, Institute Eurecom; Florian Kaltenberger, Dominique Nussbaum, Eurecom; Rogerio Dionisio, Jose Ribeiro, Paulo Marques, Instituto de Telecomunicaçoes; Juhani Hallio, Mikko Jakobsson, Jani Auranen, Reijo Ekman, Jarkko Paavola, Arto Kivinen, Turku University of Applied Sciences; Heikki Kokkinen, Fairspectrum; Ha-Nguyen Tran, Kentaro Ishizu, Takeshi Matsumura, Kazuo Ibuka, Hiroshi Harada, National Institute of Information and Communications Technology; Toma? ?olc, Mihael Mohorcic, Jozef Stefan Institute; Keiichi Mizutani, Hiroshi Harada, Kyoto University

3 Evaluation of channel availability for mobile device by using a TV white space database qualified by the Ofcom
Ha-Nguyen Tran, Self; Kentaro Ishizu, Fumihide Kojima, NICT

4 Call Admission Control Strategy for Cognitive Radio Networks with VoIP-Traffic
Genaro Hernandez-Valdez, Universidad Autonoma Metropolitana; Felipe A. Cruz-Pérez, S. Lirio Castellanos-López, CINVESTAV-IPN; Mario E. Rivero-Ángeles, UPIITA-IPN

5 Interference Performance Evaluation of Secondary Users in Cognitive Radio Networks
Ain-ul-Aisha, Nikita Mayekar, Alexander Wyglinski, Worcester Polytechnic Institute

Tuesday, 12 May 2015 14:00-15:30 Conference Room 4/5

2P: Multiple Antenna Systems and Services

1 Precoding Optimization for Secure Target User in Multi-Antenna Broadcast Channel
Manli Ma, Huiming Wang, Feng Liu, Chao Wang, Xi'an Jiaotong University

2 A Gradient-descent Weighted Sum MSE Transceiver Design for Multi-user Multi-relay Downlink Systems
Chiao-En Chen, Shih-Kai Chou, National Chung Cheng University

3 Investigation on Distributed User Selection for Uplink Multicell Systems with MIMO
Yi-Syun Yang, Jyun-Wei Pu, National Taiwan University; Po-Hsuan Yeh, FIH Mobile Limited; Chih-Peng Li, National Sun Yat-Sen University; Hsueh-Jyh Li, National Taiwan University

4 Evaluation of Space-Time Diversity Techniques in Car-to-Car Communications
Torsten Eichner, Matthias Maschlanka, Michael Meuleners, Christoph Degen, Hochschule Niederrhein - University of Applied Sciences

5 Hybrid Beamforming under Equal Gain Constraint for Maximizing Sum Rate at 60 GHz
Gaojian Wang, Gerd Ascheid, RWTH Aachen University

6 Base Station Density Bounded by Maximum Outage Probability in Massive MIMO System
Xun Zou, Gaofeng Cui, Minghuan Tang, Wang Weidong, Beijing University of Posts and Telecommunications

7 Superimposed Pilots based Secure Communications for a System with Multiple Antenna Arrays
Yejian Chen, Alcatel-Lucent Bell Labs Germany

8 Group Decoders for Correlated Massive MIMO Systems: The Use of Random Matrix Theory
Yahia Hassan, Marc Kuhn, Armin Wittneben, Swiss Federal Institute of Technology (ETH) Zurich

9 Differential CSIT Acquisition Based on Compressive Sensing for FDD Massive MIMO Systems
Wenqian Shen, Bichai Wang, Jie Feng, Cong Gao, Junjie Ma, Tsinghua University

10 A Distributed Taxation Based Rank Adaptation Scheme for 5G Small Cells
Davide Catania, Andrea Fabio Cattoni, Nurul Huda Mahmood, Gilberto Berardinelli, Aalborg University; Frank Frederiksen, Nokia Networks; Preben E. Mogensen, Aalborg University

11 The Effect of Poor Scattering on the Degrees-of-Freedom in Interfering Multiple-Access Channels
Jangho Yoon, KAIST; Won-Yong Shin, Dankook University; Hwang Soo Lee, KAIST

12 Reduced-Complexity Stack Decoder for MIMO Systems
Asma Mejri, Telecom-ParisTech; Ghaya Rekaya Ben-Othman, Telecom ParisTech

13 The Impact of Regulatory Transmit Power Constraints on the Relative Performances of Wi-Fi Beamforming & Antenna Selection
Di Kong, Evangelos Mellios, Geoffrey Hilton, Angela Doufexi, Andrew Nix, University of Bristol

14 Joint Tomlinson-Harashima Precoding and Transmit Equalization in Time-Domain for Single-Carrier MU-MIMO Block Transmission
Shohei Yoshioka, Shinya Kumagai, Fumiyuki Adachi, Tohoku University

15 Three Dimensional Beamforming and Limited Feedback Precoding for Future LTE-Advanced Systems with Large-scale Antenna Arrays
Guixian Xu, Beijing University of Posts and Telecommunications; Weiguo Ma, State Key Laboratory of Wireless Mobile Communications (CATT); Yuwei Ren, Shanzhi Chen, Kai Zhang, Beijing University of Posts and Telecommunications

16 Outage Analysis of Multi-User Massive MIMO Systems Subject to Composite Fading
Muhammad Saad Zia, Syed Ali Hassan, National University of Sciences and Technology

17 Codeword Metric Calculation Scheme for Outer Code in Overloaded MIMO-OFDM System
Yoshihito Doi, Yukitoshi Sanada, Keio University

18 Conditional Single Tree Search Sphere Decoding
Xinyu Mao, Weiliang Fan, Zhijun Wang, Dou li, Haige Xiang, Peking University

Tuesday, 12 May 2015 16:00-17:30 Conference Room 1

3A: D2D

Chair: Kyle Jung-Lin Pan, InterDigital

1 In-band Emission in LTE-A D2D: Impact and Addressing Schemes
Dong Li, Yong Liu, Alcatel-Lucent Shanghai Bell Co., Ltd

2 Network-assisted Neighbor Discovery based on Power Vectors for D2D Communications
Carlos Silva, Tarcisio F. Maciel, Rodrigo Batista, Lunider Elias, Alexandre Robson, Francisco Rodrigo Porto Cavalcanti, Wireless Telecom Research Group (GTEL), Federal University of Ceara

3 Outage Protection for Cellular-Mode Users in Device-to-Device Communications through Stochastic Optimization
QuangTuan Thieu, Hung-Yun Hsieh, National Taiwan University

4 Uplink Power Control with Variable Target SINR for D2D Communications Underlying Cellular Networks
Yuri Melo, Rodrigo Batista, Carlos Silva, Tarcisio F. Maciel, José Mairton B. da Silva Jr., Francisco Rodrigo Porto Cavalcanti, Wireless Telecom Research Group (GTEL), Federal University of Ceara

5 Network-Assisted Device-to-Device Scheduling in LTE
Xingqin Lin, The University of Texas at Austin; Rapeepat Ratasuk, Amitava Ghosh, Nokia Networks

Tuesday, 12 May 2015 16:00-17:30 Conference Room 2

3B: Channel Estimation

Chair: Andres Navarro, Universidad Icesi

1 Joint Channel and Phase Noise Estimation for Full-duplex Systems using the EM algorithm
Ji-Won Choi, Seong-Cheol Kim, Seoul National University; Jong-Ho Lee, Gachon University; Yong-Hwa Kim, Myongji University

2 Fast Convergence Algorithm for Blind Channel Estimation and Equalization using CMF-DFE
Ismail Kaya, Emin Tu?cu, Karadeniz Technical University; Ali Özen, Nuh Naci Yazgan University; Andrew Nix, University of Bristol

3 Blind Channel Estimation for CP/CP-free OFDM Systems Using Subspace Approach
Shih-Hao Fang, Industrial Technology Research Institute

4 Preamble-Based LMMSE Channel Estimation in OFDM/OQAM Modulation
Ludovic Caro, ECAM Rennes; Vincent Savaux, Supélec; Denys Boiteau, Moïse Djoko-Kouam, ECAM Rennes; Yves Louët, SUPELEC

5 Indirect Learning Hybrid Memory Predistorter Based On Polynomial and Look-Up-Table
Zheren Long, Hua Wang, Ning Guan, Nan Wu, Dongxuan He, Beijing Institute of Technology

Tuesday, 12 May 2015 16:00-17:30 Conference Room 3

3C: Duplexing and UL/DL Resource Allocation

Chair: Fernando Velez, University of Beira Interior

1 On the potential of Full Duplex Communication in 5G Small Cell Networks
Nurul Huda Mahmood, Gilberto Berardinelli, Fernando Tavares, Preben E. Mogensen, Aalborg University

2 4G Multicell Systems with In-Band Full Duplex Relays: Using Beamforming to Lower Self-Interference and/or Transmitted Powers
Dimitra Zarbouti, George Tsoulos, Georgia Athanasiadou, University of Peloponnese

3 Flexible UL/DL in Small Cell TDD Systems: A Performance Study with TCP Traffic
Davide Catania, Marta Gatnau, Andrea Fabio Cattoni, Aalborg University; Frank Frederiksen, Nokia Networks; Gilberto Berardinelli, Preben E. Mogensen, Aalborg University

4 Virtual full duplex via joint selection of transmission point and DL/UL configuration
Weiwei Wang, Xin Wang, Fujitsu R&D Center Co., Ltd

Tuesday, 12 May 2015 16:00-17:30 Conference Room 6

3D: Energy Efficient Base Stations and Networks

Chair: John Thompson, University of Edinburgh

1 Spectral and Energy Efficiency Analysis of Dense Small Cell Networks
Edwin Mugume, Daniel K C So, University of Manchester

2 A Flexible and Future-Proof Power Model for Cellular Base Stations
Björn Debaillie, Claude Desset, Filip Louagie, IMEC

3 A Load-aware Base Station Switch-off Technique for Enhanced Energy Efficiency and Relatively Identical Outage Probability
Hanifa Nabuuma, Emad Alsusa, Wahyu Pramudito, University of Manchester

4 Enhancing LTE Energy Performance with Antenna Muting and Dynamic Psi-Omni Configuration
Pål Frenger, Zeid Al-Husseiny, Ericsson

5 Reducing the Electromagnetic Exposure over LTE Networks by means of an Adaptive Retransmission Scheme: a use case based on a video service
Luis Diez, Ramon Aguero, University of Cantabria; Joël Penhoat, Orange Labs.

Tuesday, 12 May 2015 16:00-17:30 Conference Room 7

3E: Equalization

Chair: Vincent Savaux, Centrale Supélec

1 Equalization of the Non-Linear Satellite Communication Channel with an Echo State Network
Marc Bauduin, Anteo Smerieri, Serge Massar, Francois Horlin, Université Libre de Bruxelles

2 Iterative Frequency-Domain Equalization for General QAM Constellations with Reduced Envelope Fluctuations through Magnitude Modulation Techniques
Marco Gomes, Instituto de Telecomunicações - University of Coimbra; Rui Dinis, Universidade Nova de Lisboa; Vitor Silva, Francisco Cercas, Luís Oliveira, Instituto de Telecomunicações - University of Coimbra

3 Joint Turbo Frequency Domain Equalization and Stochastic Recursive Filtering Carrier Synchronization
Pedro Pedrosa, Instituto de Telecomunicações; Rui Dinis, Universidade Nova de Lisboa; Fernando Nunes, Antonio Rodrigues, Instituto Superior Técnico

4 Spectrum Efficient Single-Sideband Single-Carrier with Frequency-Domain Equalization
Kohei Abo, Thanh Hai Vo, Amnart Boonkajay, Fumiyuki Adachi, Tohoku University

5 Capacity Analysis of Uplink WCDMA Systems with Imperfect Channel State Information
Tan Tai Do, Su Min Kim, Tobias Oechtering, Royal Institute of Technology (KTH); Gunnar Peters, Huawei Technologies Sweden AB

Tuesday, 12 May 2015 16:00-17:30 Main Auditorium B

3G: mm-Wave and 3D MIMO

Chair: Reiner S. Thomä, TU Ilmenau

1 Low Complexity Compressed Sensing Based Channel Estimation in 3D MIMO Systems
Ailing Wang, Ying Wang, Jing Xu, Zehua Wei, Beijing University of Posts and Telecommunications Beijing

2 Performance Analysis of mmWave LOS-MIMO Systems with Uniform Circular Arrays
Liang Zhou, Yoji Ohashi, Fujitsu Laboratories Ltd.

3 Spatial Coexistence of Millimeter-Wave Distributed Indoor Channels
Katsuyuki Haneda, Jan Jarvelainen, Afroza Khatun, Aalto University; Kenichi Takizawa, NICT

4 Line-Of-Sight MIMO Channel in Millimeter-Wave Beamforming System: Modeling and Prototype Results
Yong-Ho Cho, Jung-Ju Kim, Samsung Electronics Co.Ltd.

5 Beam Space Selection for High Rank Millimeter Wave Communication
Chia-Hao Yu, Ming-Po Chang, MediaTek Inc.; Jiann-Ching Guey, Mediatek

Tuesday, 12 May 2015 16:00-17:30 Main Auditorium C

3H: Transmission Technologies II

Chair: Timothy O'Farrell, University of Sheffield

1 Lapped-OFDM as an alternative to CP-OFDM for 5G asynchronous access and cognitive radio
Maurice Bellanger, Electronic an Communications Laboratory/CNAM; Davide Mattera, Mario Tanda, Università degli Studi di Napoli Federico II

2 A Robust Timing and Frequency Synchronization Scheme for DVB-T2 system
Xuekun Zhang, Hongxia Bie, Chunyang Lei, Jian Zheng, Beijing University of Posts and Telecommunications

3 Non-Cooperative Feedback Control Game for Improving Throughput Fairness in MIMO Broadcast Channels
Seonghun Yun, KAIST; Jungho Myung, Electronics and Telecommunications Research Institute; Jeongwan Koh, KAIST; Kwang Eog Lee, Agency for Defense Development; Joonhyuk Kang, KAIST

4 Robust Artificial Noise Aided Transmit Method for Multicast MISO Wiretap Channels with Imperfect Covariance-based CSI
Lijian Zhang, Liang Jin, Wenyu Luo, Zhou Zhong, Dingjiu Yu, Zhengzhou Information Science and Technology Institute

5 Spectral Efficient Doppler Diversity Transmissions in High Mobility Systems with Channel Estimation Errors
Weixi Zhou, Southwest Jiaotong University; Jingxian Wu, University of Arkansas; Pingzhi Fan, Southwest Jiaotong University

Tuesday, 12 May 2015 16:00-17:30 Level 1 Auditorium

3I: Cognitive and Cooperative Networks

Chair: Yue Frank Gao, Queen Mary University of London

1 Cooperative ARQ Retransmission based Spectrum Leasing for Cognitive Radio Networks
Xiaoyan Wang, Yusheng Ji, National Institute of Informatics; Jie Li, University of Tsukuba

2 Critical analysis of Learning Algorithms in Random Neural Network based Cognitive Engine for LTE Systems
Ahsan Adeel, Hadi Larijani, Abbas Javed, Ali Ahmadinia, Glasgow Caledonian University

3 Enhancement of Hybrid Cognitive Approach for Femtocells
Pavel Mach, Zdenek Becvar, Czech Technical University in Prague

4 Performance Study of the Dual-hop Underlay Cognitive Network in the Presence of Co-Channel Interference
Jamal Hussein, Newcastle University; Salama Ikki, Lakehead University; Said Boussakta, Charalampos C. Tsimenidis, Newcastle University

5 A Multi-phase Decode-and-Forward Transmission Protocol in Cognitive Relay Networks: Outage Analysis and Relay Power Allocation
Wenxuan Lin, Ying Wang, Beijing University of Posts and Telecommunications; Frank Y. Li, University of Agder

Tuesday, 12 May 2015 16:00-17:30 Conference Room 4/5

3P: Cooperative Communications, Distributed MIMO and Relaying

1 Energy-Efficient Distributed Beamforming in UWB Based Implant Body Area Networks
Jie Ding, Eryk Dutkiewicz, Macquarie University; Xiaojing Huang, University of Technology, Sydney; Gengfa Gang, Macquarie University

2 Robust Relay Precoding in MIMO Cognitive Networks with Bounded Channel Uncertainties
Xinzheng Jie, Yunxiao Zu, Hongjian Huang, Beijing University of Posts and Telecommunications

3 Relay Selection and Power Control for Energy-Efficient Cooperative Multicast Communication
Wuyu Shi, Guodong Zhao, Zhi Chen, University of Electronic Science and Technology of China

4 Opportunistic Fixed Gain Bidirectional Relaying With Outdated CSI
Fahd Ahmed Khan, King Abdullah University of Science and Technology (KAUST); Kamel Tourki, Huawei Technologies; Mohamed-Slim Alouini, KAUST; Khalid Qaraqe, Texas A&M University at Qatar

5 Robust Precoder-and-Receiver Design for Interference Suppression and Channel Uncertainty Restraint in Multi-User CoMP System
Datong Xu, Pinyi Ren, Qinghe Du, Li Sun, Xi'an Jiaotong University

6 Transmission Strategy for Interference Alignment in a System-level Perspective
Elvis Stancanelli, Paulo Garcia Normando, Yuri C. B. Silva, Federal University of Ceará; Sara Sandberg, Ericsson Research; Francisco Rodrigo Porto Cavalcanti, Federal University of Ceara

7 Simple Clustering Methods for Multi-hop Cooperative Device-to-Device Communication
Luis Felipe Del Carpio, Alexis Alfredo Dowhuszko, Olav Tirkkonen, Aalto University; Gang Wu, University of Electronic Science and Technology of China

8 An Investigation on Cooperative Interference Prediction in LTE-A Indoor Hotspot Scenarios
Li Qiang, Chao Li, Wu Yu-chun, Shulan Feng, Philipp Zhang, Hisilicon Technologies, Huawei

9 Source and Relay Precoder Designs to Maximize Sum Rate in Two-Way Relay System with Multiple Sources
Changdon In, Jae-Mo Kang, Hyung-Myung Kim, Korea Advanced Institute of Science and Technology

10 Physical Layer Network Coding with Gaussian Waveforms using Soft Interference Cancellation
Matthias Woltering, Dirk Wübben, Armin Dekorsy, University of Bremen

11 Optimal Link Selection in Multi-Source and Multi-Destination Buffer-Aided Relay Networks
Li Wei, University of Electronic Science and Technology of China; Yu Gong, Loughborough University; Zhi Chen, University of Electronic Science and Technology of China

12 Shining a Light into the Darkness: How Cooperative Relay Communication Mitigates Correlated Shadow Fading
Tingting Lu, Pei Liu,; Shivendra S. Panwar, Polytechnic University

13 Transceiver Impairments in DF/AF Dual-Hop Cognitive Relay Networks: Outage Performance and Throughput Analysis
Dang Khoa Nguyen, Hiroshi Ochi, Kyushu Institute of Technology

14 Optimum Power Allocation for LDPC coded Soft Forwarding Scheme in Wireless Networks
Dushantha Nalin K Jayakody, University of Tartu, Estonia; Jun Li, University of Sydney, Australia

15 Optimal Sequential Precoder Design for MIMO-Relay-ARQ Systems with Direct Links
Zhengyu Zhang, Qinghua Wang, The 38th Research Institute of CETC; Ling Qiu, University of Science and Technology of China

16 Multi-user MIMO Channel Estimation with Multiple CSI Feedbacks in an LTE-Like Scenario
Yen-Kai Wang, David Lin, National Chiao Tung University

17 A Unified Codebook Structure for Various Antenna Configurations
Lu Wu, Hao Liu, Dong Li, Alcatel-Lucent Shanghai Bell Co., Ltd.

18 LMMSE-Based Channel Estimation for LTE-Advanced MIMO Downlink Employing UE-Specific Reference Signals
Chia-Yu Hsieh, David Lin, National Chiao Tung University; Chingwo Ma, Institute for Information Industry

Wednesday 13 May 2015

Wednesday, 13 May 2015 11:00-12:30 Conference Room 1

4A: Smart Grid and Electric Vehicles

Chair: Prasanta Ghosh, Syracuse University

1 An Adaptive Charging Algorithm for Electric Vehicles in Smart Grids
Abdoulmenim Bilh, Kshirasagar Naik, Ramadan El-Shatshat, University of Waterloo

2 Performance Analysis of IEEE 802.11af Standard based Neighbourhood Area Network for Smart Grid
Huamiao Hu, Dritan Kaleshi, Angela Doufexi, Li Li, University of Bristol

Wednesday, 13 May 2015 11:00-12:30 Conference Room 2

4B: Channel Characterization

Chair: Richard Martin, The Air Force Institute of Technology

1 A Generalized Mixture of Gaussians Model for Fading Channels
Omar Alhussein, Simon Fraser University; Bassant Selim, Tasneem Assaf, Khalifa University of Science Technology and Research; Sami (Hakam) Muhaidat, Jie Liang, Simon Fraser University; George Karagiannidis, Aristotle University of Thessaloniki

2 An Alternative Method for ARMA(p, q) Model Characterization of Multipath Fading Channels
Manuel Diogo Mera, Gonçalo Tavares, INESC-ID Lisbon / IST Lisbon; Manuel Duarte Ortigueira, Faculdade de Ciências e Tecnologia/ UNINOVA

3 On the Performance Analysis of Digital Communications over Weibull-Gamma Channels
Imran Shafique Ansari, Mohamed-Slim Alouini, King Abdullah University of Science and Technology (KAUST)

4 Stochastic Geometry Analysis of the Energy Efficiency of Downlink MIMO Cellular Networks
Peng Guan, Marco Di Renzo, CNRS - SUPELEC - University Paris-Sud XI

5 Achievable Sum Rate Comparison of MIMO OFDMA and SC-FDMA Systems with Linear Receivers
Zhao Longhai, Sha Xuejun, Wu Xuanli, Harbin Institute of Technology

Wednesday, 13 May 2015 11:00-12:30 Conference Room 3

4C: Radio Resource Management II

Chair: Tuan Le, Middlesex University

1 Mirroring LTE Scheduler Performance with an Adaptive Simulation Model
Razvan-Florentin Trifan, Regis Lerbour, Yann Le Helloco, InfoVista

2 Resource Allocation for Power Minimization in Multi-Band Wireless Networks
Jae Cheol Park, Electronics and Telecommunications Research Institute; Kyu-Min Kang, ETRI; Seung-Keun Park, Electronics and Telecommunications Research Institute (ETRI)

3 Extending the LTE-Sim Simulator with Multi-band Scheduling Algorithms for Carrier Aggregation in LTE-Advanced Scenarios
Daniel Robalo, Fernando J Velez, Rui R. Paulo, Instituto de Telecomunicações/DEM - Universidade da Beira Interior; Giuseppe Piro, Politecnico di Bari

4 Joint Base Station Association and Radio Resource Allocation for Downlink Carrier Aggregation in LTE-Advanced Systems
Pei-Rong Li, Chih-Wei Kuo, Kai-Ten Feng, Tain-Sao Chang, National Chiao Tung University

5 A Novel Approach for Unicast and Multicast Traffic Management in Wireless Networks
Sara Pizzi, Massimo Condoluci, Giuseppe Araniti, Antonella Molinaro, Antonio Iera, University 'Mediterranea' of Reggio Calabria

Wednesday, 13 May 2015 11:00-12:30 Conference Room 6

4D: MIMO Antennas and Array Signal Processing

Chair: Zhinong Ying, Sony Mobile

1 A Novel Triple-Band Antenna for WLAN/WiMAX Applications
Xieyong He, Dongya Shen, Xiupu Zhang, Qiong Zhou, Jing Cao, Wenping Ren, Yunnan University

2 Downlink Vertical Beamforming Designs for Multi-User MISO Systems
Wookbonk Lee, LG Electronics; Sang-Rim Lee, Han-bae Kong, Han JIn Kim, Inkyu Lee, Korea University

3 Multi-band Compact Antenna for Smartphones Supporting LTE Carrier Aggregation
Alexandru Tatomirescu, Gert F. Pedersen, Aalborg University

4 Variable Geometry Conformal Antenna Array for Element Comparison
Timothy Pelham, Geoffrey Hilton, Christopher Railton, University of Bristol

5 Load-Modulated Single-RF MIMO Transmission for Spatially Multiplexed QAM Signals
Seung-Eun Hong, ETRI; Kyoung-Sub Oh, Gamma Nu, Inc

Wednesday, 13 May 2015 11:00-12:30 Conference Room 7

4E: Spectrum Sensing

Chair: Oliver Holland, King's College London

1 A Cross-layer Aware Sensing-throughput Tradeoff for Multi-channel Cognitive Radio Networks
Zhang Shaojie, National University of Defense Technology; Abdelhakim Hafid, University of Montreal; Zhuo Wang, Beijing University of Posts and Telecommunications; Haitao Zhao, Wang Shan, National University of Defense Technology

2 Censoring for Improved Sensing Performance in Infrastructure-less Cognitive Radio Networks
Mohammed Seif, Nile University; Mohammed Karmoose, University of California, Los Angeles; Moustafa Youssef, Egypt-Japan University of Science and Technology (E-JUST)

3 Optimal n-out-of-K Voting Rule for Cooperative Spectrum Sensing with Energy Detector over Erroneous Control Channel
Narasimha Rao Banavathu, IIT Hyderabad; Mohammed Zafar Ali Khan, Indian Institute of Technology Hyderabad

4 Distributed Clustering Algorithm for Spatial Field Reconstruction in Wireless Sensor Networks
Vinay Prasad Chowdappa, Carmen Botella, Baltasar Beferull Lozano, Universidad de Valencia

Wednesday, 13 May 2015 11:00-12:30 Conference Room 8

4F: Cellular and Heterogeneous Networks

Chair: Fu-Chun Zheng, University of Reading

1 Analysis of Downlink Heterogeneous Cellular Networks with Frequency Division: A Stochastic Geometry Way
Yongce Chen, Ying Wang, Lisi Jiang, Yuan Zhang, Beijing University of Posts and Telecommunications

2 Mobility Sensitivity Analysis for LTE-Advanced HetNet Deployments with Dual Connectivity
Simone Barbera, Lucas Chavarria Gimenez, Laura Luque Sanchez, Aalborg University; Klaus I. Pedersen, Per Henrik, Nokia Networks

3 Gain Analysis of Adaptive MIMO Semisoft Handover in LTE-OFDM systems
Jin-Taek Lim, Dong-Ho Cho, KAIST

4 SDR-based network impersonation attack in GSM-compatible networks
Santiago Aragón, Instituto Tecnológico Autónomo de México (ITAM); Tania Villa, Federal Institute of Telecommunications; Federico Kuhlmann, ITAM

5 Approximating Equilibrium in the Digital Marketplace
Jakub Konka, Craig Michie, Ivan Andonovic, Robert Atkinson, University of Strathclyde

Wednesday, 13 May 2015 11:00-12:30 Conference Room 4/5

4P: Transmission Technologies and Communication Theory I

1 New Exact and Asymptotic Results of Dual-Branch MRC over Correlated Nakagami-$ m $ Fading Channels
Hessa Al-Quwaiee, Mohamed-Slim Alouini, King Abdullah University of Science and Technology (KAUST)

2 Random Element Quantization for Finite Rate Feedback Systems
Khaled Ardah, Darlan Cavalcante Moreira, Yuri C. B. Silva, Walter Freitas, Francisco Rodrigo Porto Cavalcanti, Federal University of Ceara

3 A Multi-bit Pseudo-random Measurement Matrix Construction Method Based on Discrete Chaotic Sequences in an MWC Under-sampling System
Xinyu Wang, Min Jia, Guo Qing, Xuemai Gu, Harbin Institute of Technology

4 Influence of Lattice Spacing in Disturbed Generalized Frequency Division Multiplexing Systems
Stephan Schedler, Volker Kuehn, University of Rostock

5 Improving Throughput of Faster-than-Nyquist Signaling over Multiple-Access Channels
Yi Feng, Jan Bajcsy, McGill University

6 Robust Synchronization Approach for MIMO-OFDM Systems with Space-Time Diversity
Leila Nasraoui, Leila Najjar, Mohamed Siala, SupCom

7 Capacity Analysis of an OFDM-based two-hops relaying PLC systems
Sana Ezzine, ENSIL; Fatma Abdelkefi, SUP'COM; Vahid Meghdadi, Jean-Pierre Cances, ENSIL University of Limoges; Ammar Bouallegue, Ecole d'Ingénieurs de Tunis

8 PAPR Reduction Using Cyclic-Selective Mapping with Delayed Correlation in Time Domain
Panca Dewi Pamungkasari, Yukitoshi Sanada, Keio University

9 Novel Calibration Framework for the Physical Layer Abstraction of (turbo) Codeword IC Receivers
Yasser Fadlallah, Raphaël Visoz, Orange Labs; Antoine O. Berthet, SUPELEC

10 Richardson Method Based Linear Precoding with Low Complexity for Massive MIMO Systems
Zhaohua Lu, ZTE; Jiaqi Ning, Chinese Academy of Sciences; Yi Zhang, Tian Xie, Wenqian Shen, Tsinghua University

11 Iterative based ML Demodulation Method for OFDM Signal under Higher Mobile Environments
Pongsathorn Reangsuntea, Mio Hourai, Mie University; Pisit Boonsrimuang, King Mongkut`s Institute of Technology Ladkrabang; Kazuo Mori, Hideo Kobayashi, Mie University

12 Novel Extending Scheme for the Construction of Rate-compatible IRA-like Codes
Wenwen Li, Jing Lei, Er-bao Li, Baoguo Li, National University of Defense Technology

13 Characterization of Ping-pong Optimized Pulse Shaping-OFDM (POPS-OFDM) for 5G systems
Zeinneb Hraiech, Fatma Abdelkefi, Mohamed Siala, Sup'Com, Tunisia; Walid Ben-Ameur, TELECOM SudParis

14 MIMO Optical Wireless Receiver Using Photodetectors with Different Fields of View
Cuiwei He, Thomas Q. Wang, Jean Armstrong, Monash University

15 Performance Analysis of FSO Links Over Unified Gamma-Gamma Turbulence Channels
Imran Shafique Ansari, Ferkan Yilmaz, Mohamed-Slim Alouini, King Abdullah University of Science and Technology (KAUST)

16 Carrier Frequency Offset Estimation Using Embedded Pseudo Random Sequences
Shuai Zhang, Chao Zhang, Changyong Pan, Tsinghua University

17 Block-wise PAPR Minimization Algorithm in STBC MIMO V2V Transmission
Adrian Langowski, Krzysztof Wesolowski, Poznan University of Technology

18 Link-level Performance of Downlink NOMA with SIC Receiver Considering Error Vector Magnitude
Keisuke Saito, Anass Benjebbour, Atsushi Harada, Yoshihisa Kishiyama, Takehiro Nakamura, NTT DoCoMo, Inc.

Wednesday, 13 May 2015 14:00-15:30 Conference Room 1

5A: Electric Vehicles

Chair: Ankur Verma, Texas Instruments

1 A Consumer Behavior Based Approach to Multi-stage EV Charging Station Placement
Chao Luo, Yih-Fang Huang, Vijay Gupta, University of Notre Dame

2 Energy Management based on Frequency Decoupling: Experimental results with Fuel Cell-ElectricVehicle Emulator
Hamza Alloui, Ecole Militaire Polytechnique - Algeirs

3 A Lightweight Simulation Framework for the Analysis of Electrified Vehicle Fleets
Ruediger Berndt, Sebastian Schellenberg, David Eckhoff, Reinhard German, University of Erlangen

4 An Adaptive Sigma Point Kalman Filter Hybridized by Support Vector Machine Algorithm for Battery SoC and SoH Estimation
Michel, Vincent Heiries, CEA-LETI

5 Estimation of the Battery Degradation Effects on the EV Operating Cost During Charging/Discharging and Providing Reactive Power Service
Mohammad Nikkhah Mojdehi, Prasanta Ghosh, Syracuse University

Wednesday, 13 May 2015 14:00-15:30 Conference Room 2

5B: Performance Analysis in Propagation Channels I

Chair: Katsuyuki Haneda, Aalto University

1 Analysis of 802.11 OFDM in High Multipath Environments
Frederic Heereman, Wout Joseph, Luc Martens, Ghent University

2 Analysis of secret key robustness in indoor radio channel measurements
Taghrid Mazloum, Telecom ParisTech; Francesco Mani, CEA-LETI; Alain Sibille, Telecom ParisTech

3 mm Wave UE Antenna Configuration Study
Steven Ferrante, Philip Pietraski, Tao Deng, Magdalena Bielinski, Interdigital

4 Network Densification Impact on System Capacity
Mårten Ericson, Magnus Thurfjell, Peter de Bruin, Ericsson Research

5 The Effect of Shadow Fading Distributions on Outage Probability and Coverage Area
Metin Vural, Berlin Technical University; Gunes Kurt, Istanbul Technical University; Christian Schneider, Technische Universität Ilmenau

Wednesday, 13 May 2015 14:00-15:30 Conference Room 3

5C: Channel Modeling and Estimation

Chair: Syed Ali Hassan, National University of Sciences and Technology (NUST)

1 Calibrating Radio Propagation Models based on Smartphone Measurements for Geo-Aware Cellular Network Self-Optimization
Bernd Gloss, Alcatel-Lucent, Bell Laboratories; Jens Gebert, Alcatel Lucent; Yanfei Quan, Alcatel-Lucent, Bell Laboratories

2 Combining Nakagami-m Fading Links for High Availability in Wireless Networks
David Öhmann, Willy Teske, Gerhard Fettweis, Technische Universität Dresden

3 Compressed Sensing-based Channel Estimation Methods for LTE-Advanced Multi-User Downlink MIMO System
Takuya Kamenosono, Megumi Kaneko, Kazunori Hayashi, Masanori Sakai, Kyoto University

4 Decision Feedback Channel Estimation Scheme Using Terminal Speed for Single-Carrier Frequency-Domain Equalization
Hirotaka Mihara, Fumiaki Maehara, Waseda University

5 A Very Low Complexity LMMSE Channel Estimation Technique for OFDM Systems
Abdelhakim Khlifi, Ridha Bouallegue, Innov'COM Labortaory Sup'Com Tunis Tunisia

Wednesday, 13 May 2015 14:00-15:30 Conference Room 6

5D: Multiuser MIMO

Chair: Emil Björnson, Linköping University

1 Energy Efficient Design of Massive MIMO: How Many Antennas?
Hong Yang, Thomas L. Marzetta, Bell Labs, Alcatel-Lucent

2 Low Complexity Soft-Input Soft-Output Detector based on Repeated Tree Search strategy.
Maria de los Ángeles Simarro, Victor M. Garcia, Francisco José Martínez Zaldivar, Alberto González, Antonio Vidal, Technical University of Valencia

3 Fractional Frequency Reuse Aided Pilot Decontamination for Massive MIMO Systems
Liyan Su, Chenyang Yang, Beihang University

4 Separated Horizontal and Vertical Transmission Methods in Massive MIMO Systems
Song Lei, Xin Wang, Yi Zhang, Hua Zhou, Fujitsu

Wednesday, 13 May 2015 14:00-15:30 Conference Room 7

5E: 5G and Future Cellular Networks I

Chair: Haris Bin Pervaiz, Lancaster University

1 Tradeoff Between Spectrum and Densification for Achieving Target User Throughput
Yanpeng Yang, Ki Won Sung, KTH Royal Institute of Technology

2 A Novel Radio Frame Structure for 5G Dense Outdoor Radio Access Networks
Petteri Kela, Huawei Technologies Finland; Jussi Turkka, Magister Solutions; Mário Costa, Huawei Technologies Finland; Tuomas Hiltunen, Magister Solutions Ltd.; Michal Hronec, Magister Solutions; Jussi Salmi, Huawei Technologies Finland (now at Zenniz); Kari Leppänen, Huawei Technologies Finland

3 Effective RAT Selection Approach for 5G Dense Wireless Networks
Antonino Orsino, Giuseppe Araniti, Antonella Molinaro, Antonio Iera, University 'Mediterranea' of Reggio Calabria

4 Filter Optimization for Carrier-Frequency- and Timing-Offset in Universal Filtered Multi-Carrier Systems
Xiaojie Wang, University of Stuttgart; Thorsten Wild, Frank Schaich, Bell Labs, Alcatel-Lucent

5 Mitigating Pilot Contamination by Pilot Reuse and Power Control Schemes for Massive MIMO Systems
Vidit Saxena, Gabor Fodor, Eleftherios (Lefteris) Karipidis, Ericsson Research

Wednesday, 13 May 2015 14:00-15:30 Conference Room 8

5F: Mobile and Ad Hoc Networks

Chair: Yichao Jin, Toshiba Research Europe Ltd

1 Validation of Mobility Simulations via Measurement Drive Tests in an Operational Network
Lucas Chavarria Gimenez, Simone Barbera, Michele Polignano, Aalborg University; Klaus I. Pedersen, Nokia Networks; Jan Elling, Mads Sorensen, Telenor Denmark

2 Impact of Realistic Pedestrian Mobility Modelling in the Context of Mobile Network Simulation Scenarios
Sören Hahn, Dennis M. Rose, Jaroslaw Sulak, Thomas Kürner, Technische Universität Braunschweig

3 RMSC: A Cell Slicing Controller for Multi-tenant Mobile Networks
Pablo Caballero, IMDEA Networks Institute / University Carlos III of Madrid; Xavier Costa, NEC; Konstantinos Samdanis, NEC Europe Ltd.; Albert Banchs, Universidad Carlos III de Madrid

4 Location-Based Pseudonyms for Identity Reinforcement in Wireless ad hoc Networks
Iulia Tunaru, CEA-Leti Minatec Campus; Benoît Denis, CEA-Leti Minatec; Bernard Uguen, IETR / CNRS / Université Rennes-I

5 Localized Mobility Management for SDN-Integrated LTE Backhaul Networks
Dongyao Wang, Lei Zhang, Yinan Qi, Atta Quddus, University of Surrey

Wednesday, 13 May 2015 14:00-15:30 Main Auditorium B

5G: Interference Mitigation and Advanced CoMP Techniques

Chair: Piya Patcharamaneepakorn, Heriot watt University

1 Centralized Dynamic Point Blanking in LTE-Advanced Network for Inter-Cell Interference Mitigation
Zhilan Xiong, Min Zhang, Hakon Helmers, Matthew Baker, Philippe Godin, Dong Li, Alcatel-Lucent Shanghai Bell Co., Ltd.

2 Performance Evaluation on Cell Clustering Interference Mitigation and CoMP in Multi-Pico Network with Dynamic TDD
Yuehong Gao, Lei Cheng, Yuancao Li, Xin Zhang, Dacheng Yang, Beijing University of Posts and Telecommunications

3 Non-Cooperative Inter-Cell Interference Coordination Technique for Increasing Throughput Fairness in LTE Networks
Mohamad Yassin, University of Rennes 1; Samer Lahoud, IRISA; Marc Ibrahim, Saint-Joseph University; Kinda Khawam, UVSQ; Dany Mezher, Saint-Joseph University; Bernard Cousin, University of Rennes 1

4 Simultaneous Wireless Information and Power Transfer for Decode-and-Forward MIMO Relay Communication Systems
Fatma Benkhelifa, Ahmed Kamal Sultan Salem, Mohamed-Slim Alouini, King Abdullah University of Science and Technology

5 Subcarrier Multiplexing in LTE-COMP OFDMA
Ibrahim Bukar, Falah Ali, University of Sussex

Wednesday, 13 May 2015 14:00-15:30 Main Auditorium C

5H: Green Cognitive Radio & WSN

Chair: Shengrong Bu, University of Glasgow

1 Energy Efficiency Optimization in OFDM-based Cognitive Radio Systems: Impact of Power Amplifiers
Xinxin Shi, Wenjun Xu, Xuemei Zhou, Jiaru Lin, Beijing University of Posts and Telecommunications

2 Energy Efficient Power Allocation in OFDM-based CRNs with Cyclic Prefix Power Transfer
Boya Li, Wenjun Xu, Shengyu Li, Jiaru Lin, Beijing University of Posts and Telecommunications

3 Lifetime-Aware Scheduling and Power Control for M2M Communications in LTE Networks
Amin Azari, Guowang Miao, KTH, Royal Institute of Technology

4 Practical Spatiotemporal Compressive Network Coding for Energy-Efficient Distributed Data Storage in Wireless Sensor Networks
Chunyang Wang, Shanghai Jiao Tong Univ.; Peng Cheng, Zhuo Chen, CSIRO; Ning Liu, Lin Gui, Shanghai Jiao Tong Univ.

5 DRX-Aware Power and Delay Optimized Scheduler for Bursty Traffic Transmission
Sofonias Hailu, Aalto University; Petteri Lunden, Virtej Elena, Nokia Research Center; Niko Kolehmainen, Magister Solutions Ltd.; Olav Tirkkonen, Aalto University; Carl Wijting, Nokia

Wednesday, 13 May 2015 14:00-15:30 Level 1 Auditorium

5I: Smart Resource Usage I

Chair: Yao-Jen Liang, National Chiayi University

1 **Energy-Efficient Power Loading with Intercarrier and Intersymbol Interference Considerations for Cognitive OFDM Systems**
Xuemei Zhou, Wenjun Xu, Xinxin Shi, Jiaru Lin, Beijing University of Posts and Telecommunications

2 **Energy-Efficient Simultaneous Information and Power Transfer in OFDM-based CRNs**
Boya Li, Wenjun Xu, Xuemin Gao, Beijing University of Posts and Telecommunications

3 **A Game Theoretical Cooperative Transmission Scheme Based on Anti-Eavesdropper Cluster Beamforming**
Wenson Chang, Yin-Hsuan Wu, National Cheng Kung University

4 **Spectrum Occupancy and Residual Service Analysis in CRNs using a Multi-server Queueing Model**
Bakht Zaman, Ziaul Haq Abbas, Ghulam Ishaq Khan Institute of Engineering Sciences and Technology; Frank Y. Li, University of Agder

5 **Joint Minimum Variance Unbiased and Maximum Likelihood Estimation of Clock Offset and Skew in One-Way Packet Transmission**
Atanu Guchhait, Karthik R.M., Samsung

Wednesday, 13 May 2015 14:00-15:30 Conference Room 4/5

5Pa: Transmission Technologies and Communication Theory II

1 **A Practical Low-Complexity Coding Scheme for the Multiple Access Channel inspired by the Compute-and-Forward Strategy**
Xabier Insausti, Aitziber Saez, Pedro M. Crespo, CEIT and TECNUN (University of Navarra)

2 **Tone Reservation based PAPR Reduction Technique with Individual Carrier Power Allocation for Multiple Peaks Reduction**
Ralph, Jean-Francois Helard, INSA Rennes; Matthieu Crussière, Institute of Electronics and Telecommunications of Rennes; Youssef NASSER, American University of Beirut

3 **Power Allocation for Cooperative Jamming in Amplify-and-Forward Relaying Network with Eavesdropper**
Yongyun Choi, Jae Hong Lee, Seoul National University

4 **Detection of pilot contamination attack for multi-antenna based secrecy systems**
Jae-Mo Kang, Changdon In, Hyung-Myung Kim, Korea Advanced Institute of Science and Technology

5 **MC-CDMA Transmission with Blanking Nonlinearity for Impulsive Noise Power-Line Communication Channels**
Khaled Rabie, Emad Alsusa, University of Manchester

6 **Performance Evaluation of SSB Transmission of DFTs-OFDM using Multi-level BPSK through Nonlinear HPA**
Masahiro Umehira, Shigeki Nihei, Hirokazu Fusayasu, Shigeki Takeda, Teruyuki Miyajima, Ibaraki University; Jun Mashino, Takatoshi Sugiyama, NTT Access Network Service Systems Laboratories

7 **Enhanced Maximum Ratio Combining for Mobile DVB-T Reception in Doubly Selective Channels**
Rana Ahmed, University of Stuttgart; Ben Eitel, Sony; Joachim Speidel, University of Stuttgart

8 **A Modified DFTs-OFDM with DC Subcarrier Shift for Low PAPR and DC Offset Error Robustness**
Shigeki Nihei, Masahiro Umehira, Shigeki Takeda, Ibaraki University

9 **Blind Order Estimation Based on Subspace Identification and Least Squares Equalization**
Yuhong Wang, Air Defense Force Academy; Liang Jin, Zhengzhou Information Science and Technology Institute

10 **Analytical Evaluation of Coverage Probability in Two-tier Cognitive Femto Networks**
Fereidoun H. Panahi, Tomoaki Ohtsuki, Keio University

11 **HARQ Transmission State Control Algorithm for MIMO Systems with IC Detection**
Younghoon Whang, Oregon State University; Sangjoon Park, Yonsei University; Huaping Liu, Oregon State University

Wednesday, 13 May 2015 14:00-15:30 Conference Room 4/5

5Pb: Satellite Networks, Positioning and Location

1 **Location Spoofing Detection for VANETs by a Single Base Station in Rician Fading Channels**
Shihao Yan, Robert Malaney, University of New South Wales; Ido Nevat, Institute for Infocomm Research, ASTAR, Singapore; Gareth W. Peters, University College London

2 **Combining Image Processing with Signal Processing to Improve Radio Position Estimation**
Amy Abraham, Richard Martin, Kirk Mathews, The Air Force Institute of Technology

3 **Broadband multi-satellite/multi-beam system with single frequency reuse**
Daisuke Goto, Fumihiro Yamashita, Takatoshi Sugiyama, Kiyoshi Kobayashi, NTT Corporation

4 **Semi-supervised Positioning Algorithm in Indoor WLAN Environment**
Xia Ying, Lin Ma, Zhang Zhongzhao, Wang Yao, Harbin Institute of Technology

5 **An embedded RF-based motorcycle trajectory data for security monitoring system over university vehicular network**
Wiroon Sriborrirux, Wasan Wiyarun, Nakorn Indra-Payoong, Panuwat Dan-klang, Burapha University

6 **Improved Hybrid AML Algorithm without identification of LOS/NLOS nodes**
Leila Gazzah, Leila Najjar, Hichem Besbes, Ecole Supérieure des Communications de Tunis, SupCom

7 **Effect of Residual Channel Estimation Errors in Random Access Methods for Satellite Communications**
Karine Zidane, University of Toulouse, ISAE/DMIA & TéSA; Jerome Lacan, ISAE; Marie-Laure Boucheret, IRIT/ENSEEIHT; Charly Poulliat, INP-ENSEEIHT; Mathieu Gineste, Damien Roques, Thales Alenia Space, Toulouse; Caroline Bes, CNES; Arnaud Deramecourt, CNES, Toulouse

Wednesday, 13 May 2015 16:00-17:30 Conference Room 1

6A: Wireless Sensor Networks

Chair: Dave Laurenson, University of Edinburgh

1 **Sustainable Traffic Aware Duty-Cycle Adaptation in Harvested Multi-Hop Wireless Sensor Networks**
Gabriele Romaniello, University of Grenoble / STMicroelectronics; Olivier Alphand, Univ. Grenoble Alpes, LIG; Roberto Guizzetti, STMicroelectronics; ADuda, INP

2 **A Storage Centric Approach to Scalable Sensor Networks**
Sedat Gormus, Karadeniz Technical University; Yichao Jin, Mahesh Sooriyabandara, Toshiba Europe Research Labs

3 **A Survey on Centralised and Distributed Clustering Routing Algorithms for WSNs**
Morteza Mohammadi Zanjireh, Hadi Larijani, Glasgow Caledonian University

4 **Effect of Distributed Backoff to Active Period Reuse Mechanism in Cluster-based IEEE 802.15.4 WSNs with Cluster Mobility and Non-uniform Traffic**
Kazuo Mori, Hideo Kobayashi, Mie University

5 **Construction of the generalized Cech complex**
Ngoc-Khuyen Le, Philippe Martins, Laurent Decreusefond, Anaïs Vergne, Telecom ParisTech

Wednesday, 13 May 2015 16:00-17:30 Conference Room 2

6B: Performance Analysis in Propagation Channels II

Chair: Weiwei Wang, Fujitsu R&D Center

1 **Network Coordinated Inter-Cell Interference Control using Horizontal-Plane Beamforming on Small Cells in 3D Cell Structure**
Kenji Hoshino, Sho Nabatame, Atsushi Nagate, Teruya Fujii, Softbank Mobile

2 **A Measurement Study of MIMO Support with Radiating Cables in Passenger Rail Cars**
Ruben Merz, Adrian Schumacher, Nima Jamaly, Daniel Wenger, Stefan Mauron, Swisscom

3 **Asymptotic Ergodic Capacity Analysis of Composite Lognormal Shadowed Channels**
Imran Shafique Ansari, Mohamed-Slim Alouini, KAUST

4 **LTE Downlink Performance in High Speed Trains**
José Rodríguez-Piñeiro, University of A Coruña; Martin Lerch, Vienna University of Technology; Pedro Suárez-Casal, José A. García-Naya, University of A Coruña; Sebastian Caban, Vienna University of Technology; Luis Castedo, University of A Coruña; Markus Rupp, Vienna University of Technology

5 **Smart Grid Communications: LTE Outdoor Field Trials at 450 MHz**
Bernd Holfeld, Stephan Jaeckel, Lars Thiele, Thomas Wirth, Fraunhofer Institute for Telecommunications, Heinrich-Hertz-Institut

Wednesday, 13 May 2015 16:00-17:30 Conference Room 3

6C: Performance Analysis

Chair: Phil Whiting, Macquarie University

1 **A Novel Antenna Selection Scheme for Spatially Correlated Massive MIMO Uplinks with Imperfect Channel Estimation**
De Mi, Mehrdad Dianati, University of Surrey; Sami (Hakam) Muhaidat, Simon Fraser University; Yan Chen, Huawei Technologies

2 **Clustered Multiuser Detection using SC-FDE Transmission with Iterative Receivers**
João Gante, Marco Gomes, Instituto de Telecomunicações - University of Coimbra; Rui Dinis, Universidade Nova de Lisboa; Vitor Silva, Instituto de Telecomunicações - University of Coimbra

3 **On the MGF-Based Approximation of the Sum of Independent Gamma-Gamma Random Variables**
Thanh Pham, Cong-Thang Truong, Anh T. Pham, University of Aizu

4 **Performance Evaluation of Spatial Complementary Code Keying Modulation in MIMO Systems**
Amir Hossein Jafari, University of Sheffield / Bell Laboratories Alcatel Lucent

5 **On the Ergodic Capacity of Dual-Branch Correlated Log-Normal Fading Channels with Applications**
Hessa Al-Quwaiee, King Abdullah University of Science and Technology (KAUST); Mohamed-Slim Alouini, KAUST

Wednesday, 13 May 2015 16:00-17:30 Conference Room 6

6D: MIMO Transmission

Chair: Frank Schaich, Alcatel-Lucent AG, Bell Labs

1 **A MIMO Precoding Based Physical Layer Security Technique for Key Exchange Encryption**
Hasan Taha, Emad Alsusa, University of Manchester

2 **Transmit design for MIMO wiretap channel with a malicious jammer**
Duo Zhang, Weidong Mei, Lingxiang Li, Zhi Chen, University of Electronic Science and Technology of China

3 **Novel Unified Analysis of Orthogonal Space-Time Block Codes over Generalized-K and AWGGN MIMO Networks**
Ehab Salahat, Hani Saleh, Khalifa University

4 **Pilot Insertion Rate for SC-FDE Systems Employing Subspace-Based Channel Estimation**
Shiva Gholami-Boroujeny, University of Ottawa; Adel Omar Dahmane, Universite du Quebec a Trois Rivieres; Claude D'Amours, University of Ottawa

5 **Secure Beamforming Design in Wiretap MISO Interference Channels**
Jian Zhou, Ruohan Cao, Hui Gao, Cong Zhang, Tiejun Lv, Beijing University of Posts and Telecommunications

Wednesday, 13 May 2015 16:00-17:30 Conference Room 7

6E: 5G and Future Cellular Networks II

Chair: Majid Nasiri Khormuji, Huawei Technologies Sweden AB

1 **Uplink Joint Reception with LLR Forwarding for Optical Transmission Bandwidth Reduction in Mobile Fronthaul**
Kenji Miyamoto, Shigeru Kuwano, Jun Terada, Akihiro Otaka, NTT Corporation

2 **Hybrid RF and VLC Systems: Improving User Data Rate Performance of VLC Systems**
Dushyantha Basnayaka, Harald Haas, University of Edinburgh

3 **Receiver Design for Downlink Non-Orthogonal Multiple Access (NOMA)**
Chunlin Yan, DOCOMO Beijing Communications Laboratories Co., Ltd.; Atsushi Harada, Anass Benjebbour, NTT DOCOMO, INC.; Yang Lan, Anxin Li, Huiling Jiang, DOCOMO Beijing Communications Laboratories Co., Ltd

4 **Efficiency-Optimized Reconfigurable Transmitter Architecture by Matching Networks for multi-band OFDM-based Standards**
José-Ramón Pérez-Cisneros, Jesús de Mingo, Pedro Luis Carro, Paloma Garcia-Ducar, Antonio Valdovinos, University of Zaragoza

5 **A Reduced Complexity Transmitter for UF-OFDM**
Thorsten Wild, Frank Schaich, Bell Labs, Alcatel-Lucent

Wednesday, 13 May 2015 16:00-17:30 Conference Room 8

6F: Signal Detection

Chair: Antoine Berthet, Supelec

1 **An Hybrid ARQ Scheme for Faster than Nyquist Signaling with Iterative Frequency-Domain Detection**
Rui Dinis, Bruno Cunha, Francisco Ganhão, Luis Bernardo, Rodolfo Oliveira, Paulo Pinto, Universidade Nova de Lisboa

2 **I/Q Interference in Device-to-Device Underlay Communication with Uplink Power Control**
Udesh Oruthota, Olav Tirkkonen, Aalto University

3 **On Interference Rejection Combining for LTE-A systems: Analysis of Covariance Estimators and an Iterative Algorithm for Frequency-Selective Channels**
Prasanth Karunakaran, University of Erlangen-Nuernberg; Thomas Wagner, Ansgar Scherb, Ericsson,; Wolfgang Gerstacker, University of Erlangen-Nuremberg

4 **Pseudo Block Coded Single-Carrier Transmission Using Frequency-Domain Block Signal Detection**
Hiroyuki Miyazaki, Fumiyuki Adachi, Tohoku University

Wednesday, 13 May 2015 16:00-17:30 Main Auditorium B

6G: Network Coding for Cooperative Communications

Chair: Megumi Kaneko, Kyoto University

1 **Constellations Maximizing Minimal Distance for Physical-Layer Network Coding Multiway Relaying**
Miroslav Hekrdla, Jan Sykora, Czech Technical University in Prague

2 **Optimal and Near Optimal Power Allocation Schemes in Two-way Relay Systems with Physical Layer Network Coding**
Yehua Yang, Chen Chen, Peking University; Lin Bai, Beihang University (BUAA); Ye Jin, Peking University; Jinho Choi, Gwangju Institute of Science and Technology

3 **Joint Signal and Interference Alignment in Two-Way Relay Communications**
Yao-Jen Liang, National Chiayi University; Hsin-Jung Chen, National Taiwan University

4 **Analysis of Multi-Source Multi-Hop Cooperative Networks Employing Network Coding**
Muhammad Arslan Aslam, Syed Ali Hassan, National University of Sciences and Technology

5 Random Linear Network Coding is Key to Data Survival in Highly Dynamic Distributed Storage
Márton Sipos, Budapest University of Technology and Economics; Frank H.P. Fitzek, Daniel Lucani, University of Aalborg

Wednesday, 13 May 2015 16:00-17:30 Main Auditorium C
6H: Green HetNets & Cloud RAN
Chair: Hong Yang, Alcatel Lucent Bell Labs

1 Energy and Spectral Efficient Microcell Deployment in Heterogeneous Cellular Networks
Mahmut Demirtas, Alkan Soysal, Bahcesehir University

2 Energy Efficient Base Station Deployment Scheme in Heterogeneous Cellular Network
Qi Ren, Jiancun Fan, Xinmin Luo, Xi'an Jiaotong University; Zhikun Xu, Yami Chen, China Mobile Research Institute

3 On the Dual-Decomposition-Based Resource and Power Allocation with Sleeping Strategy for Heterogeneous Networks
Ahmad Alsharoa, Hakim Ghazzai, King Abdullah University of Science and Technology (KAUST); Elias Yaacoub, Qatar Mobility Innovations Center (QMIC); Mohamed-Slim Alouini, KAUST

4 Dynamic Traffic Offloading and Transmit Point Muting for Energy and Cost Efficiency in Virtualized Radio Access Networks
Mohamed A. Rashad Salem, Huawei Technologies

5 Energy Efficient Control for Software Defined Cloud Radio Access Network based on Small Cell
Lei Cheng, Yuehong Gao, Jinxi Fu, Xin Zhang, Zaixue Wei, Dacheng Yang, Beijing University of Posts and Telecommunications

Wednesday, 13 May 2015 16:00-17:30 Level 1 Auditorium
6I: Smart Resource Usage II
Chair: Kyle Jung-Lin Pan, InterDigital

1 Cross-Polarized Complementary Frequency Allocation in Femto-Macro Network
Ponnu Jacob, A.S. Madhukumar, Vinod A.P., Nanyang Technological University

2 Adaptive Spectrum Sharing of LTE Co-existing with WLAN in Unlicensed Frequency Bands
Xing Minyao, Yuexing Peng, Teng Xia, Hang Long, Kan Zheng, Beijing University of Posts and Telecommunications

3 Multi-Leader Stackelberg Games in Multi-Channel Spatial Aloha Networks
Jiangbin Lyu, National University of Singapore; Yong Huat Chew, Institute for Infocomm Research; Wai-Choong, Wong, National University of Singapore

4 Random Access for Multiple Secondary Pairs in Cognitive Radio Networks with Imperfect Sensing
Seung Geun Hong, Jae Hong Lee, Seoul National University

5 Overlay Spectrum Sharing with Multiuser Two-Way Relaying using TDBC in Nakagami-m Fading
Pankaj Kumar Sharma, Prabhat Kumar Upadhyay, Indian Institute of Technology Indore

Wednesday, 13 May 2015 16:00-17:30 Conference Room 4/5
6Pa: Vehicular Electronics and Communications

1 Packet Combining Relay Scheme with Sectorized Relay Station for Reliable ITS V2V Communication
Le Tien Trien, Yasushi Yamao, University of Electro-Communications

2 Stress Test Of Vehicular Communication Transceivers Using Software Defined Radio
Dimitrios Vlastaras, Steffen Malkowsky, Fredrik Tufvesson, Lund University

3 Pre-distribution of certificates for pseudonymous broadcast authentication in VANET
Michael Feiri, University of Twente; Rolf Pielage, Eindhoven University of Technology; Jonathan Petit, University College Cork; Nicola Zannone, Eindhoven University of Technology; Frank Kargl, University of Ulm

4 State Observation and Communication for Cloud Vehicle Control
Takeki Ogitsu, Tokyo University of Science; Manabu Omae, Keio University

5 An Experimental Evaluation of the Space Diversity Technique for Tire Pressure Monitoring System
Mohamed Cheikh, Continental Automotive

6 Ensuring 'Always Satisfactorily Connected' in Cooperative Vehicular Networks
Olivia Brickley, Dirk Pesch, Cork Institute of Technology

7 Broadcast Transmission Capacity of VANETs with Secrecy Outage Constraints under Multiple frequency bands
Xinxin He, Weisen Shi, Tao LUO, Beijing University of Posts and Telecommunications

8 A Real-Time MAC Protocol for In-Vehicle Power Line Communications Based on HomePlug GP
Roberto P. Antonioli, Federal University of Ceara, Brazil; Morgan Roff, Queen's University; Zhengguo Sheng, University of British Columbia; Jia Liu, Beijing Information Science & Technology University; Victor C. M. Leung, The University of British Columbia

9 A Stable Routing Protocol for Highway Mobility over Vehicular Ad-Hoc Networks
Yang He, Wenjun Xu, Xuehong Lin, Beijing University of Posts and Telecommunications

10 An efficient combination of topological and geographical routing for VANETs on top of a virtualization layer
Jack Fernando Bravo-Torres, Salesian Polytechnic University; Martin Lopez-Nores, José Víctor Saiáns-Vázquez, Yolanda Blanco-Fernández, José Juan Pazos-Arias, University of Vigo

11 NAVI: Neighbor-Aware Virtual Infrastructure for Information Collection and Dissemination in Vehicular Networks
Pedro M. d'Orey, Nitin Maslekar, NEC Laboratories Europe; Idoia de la Iglesia, University of Deusto; Nikola Zahariev, NEC Laboratories Europe

12 Development of a Drive-in Driver-in-Loop fully immersive driving simulator for virtual validation of automotive systems
Siddartha Khastgir, Stewart Birrell, Gunwant Dhadyalla, Paul Jennings, University of Warwick

13 Analysis and Implementation of the Semi-Global Matching 3D Vision Algorithm Using Code Transformations and High-Level Synthesis
Affaq Qamar, Fahad Bin Muslim, Luciano Lavagno, Politecnico di Torino

Wednesday, 13 May 2015 16:00-17:30 Conference Room 4/5
6Pb: Antennas, Propagation and RF Design

1 Statistical Characterization of Dynamic Multi-Path Components for Vehicle-to-Vehicle Radio Channels
Ruisi He, Beijing Jiaotong University; Olivier Renaudin, University of Southern California; Veli-Matti Kolmonen, Katsuyuki Haneda, Aalto University; Zhangdui Zhong, Bo Ai, Beijing Jiaotong University; Claude Oestges, Université catholique de Louvain (UCL)

2 Experimental Results of Digital Predistorter for Very Wideband Mobile Communication System
Yuelin Ma, Yasushi Yamao, University of Electro-Communications

3 A New Spatially Correlated Shadowed Channel Model with Cognitive Radio Application
Roberto César Dias Vilela Bomfin, Rausley Adriano Amaral de Souza, National Institute of Telecommunications (Inatel)

4 EVM Derivation for Multicarrier Signals: Joint Impact of Non-Linear Amplification and Predistortion
Cheaito Ali, INSA de Rennes; Matthieu Crussière, Institute of Electronics and Telecommunications of Rennes; Yves Louët, SUPELEC; Jean-Francois Helard, INSA Rennes

5 A 15GHz Full Duplex System for Microwave Backhauling
Meng Cai, Qiao Liu, Hongli Jiang, Ping Cao, Cheng Hong, Huawei Technologies Co. ltd.

Thursday 14 May 2015

Thursday, 14 May 2015 10:30-12:00 Conference Room 1

7A: Vehicular Channel Characterization and Performance Evaluation

Chair: Joaquim Ferreira, University of Aveiro

1 Characterization of First and Second Order Statistics of Large Scale Fading Using Vehicular Sensors
Haris Kremo, Toyota InfoTechnology Center; Kohsuke Nakagawa, University of Electro-Communications; Onur Altintas, Hideaki Tanaka, Toyota InfoTechnology Center; Takeo Fujii, University of Electro-Communications

2 Infrastructure to Vehicle Throughput Performance in LTE-A for 2D and 3D 3GPP/ITU Channel Models
Jayashree Thota, University Of Bristol; Reham Almesaeed, Angela Doufexi, University of Bristol; Simon Armour, University Of Bristol; Andrew Nix, University of Bristol

3 Performance Analysis for High-Velocity Connected Vehicles
Bengi Aygun, Mostafa El Gamal, Alexander Wyglinski, Worcester Polytechnic Institute

4 Performance of LTE Mobile Relay Node Usage for Uplink Access in High Speed Railway Scenarios
Jaime Calle, Eduardo Martinez-de-Rioja, Mariano Molina-Garcia, José I. Alonso, Technical University of Madrid

5 A Probabilistic Model Checking Analysis of Vehicular Ad-hoc Networks
Bruno Ferreira, Fernando A. F. Braz, Sergio V. A. Campos, Federal University of Minas Gerais; Antonio Alfredo Loureiro, UFMG

Thursday, 14 May 2015 10:30-12:00 Conference Room 2

7B: Indoor Localisation and Positioning

Chair: Nitin Maslekar, NEC Europe

1 Map-aware Indoor Area Estimation with Shortest Path Based on RSS Fingerprinting
Heng-Xiu Liu, Bo-An Chen, National Chiao Tung University; Po-Hsuan Tseng, National Taipei University of Technology; Kai-Ten Feng, National Chiao Tung University; Tian-Sheng Wang, Taiwan High Prosecutors Office

2 Angle Offset-Assisted Positioning of Railway Vehicles in Tunnel Environments
Cuiran Li, Lanzhou Jiaotong University

3 A Theoretical Error Analysis on Indoor TOA Localization Scheme Using Unmanned Aerial Vehicles
Azusa Danjo, Yuki Watase, Shinsuke Hara, Osaka City University

4 Indoor Positioning based on Bayesian Filter using Magnetometer Measurement Difference
Binhee Kim, Seung-Hyun Kong, KAIST

5 On Hybrid Localization in Half-Open Areas
Geng Li, Kaigui Bian, Yuping Zhao, Dou li, Peking University

Thursday, 14 May 2015 10:30-12:00 Conference Room 3

7C: Heterogeneous Networks I

Chair: Haris Bin Pervaiz, Lancaster University

1 System-Level Performance of Downlink Non-orthogonal Multiple Access (NOMA) Under Various Environments
Yuya Saito, Anass Benjebbour, Yoshihisa Kishiyama, Takehiro Nakamura, NTT DoCoMo, Inc.

2 A Cooperative Resource Allocation Scheme Based on Self-Organized Network in Ultra-Dense Small Cell Deployment
Lei Cheng, Yuehong Gao, Yuancao Li, Beijing University of Posts and Telecommunications; Xiaofeng Liu, China Academy of Information and Communications Technology; Dacheng Yang, Beijing University of Posts and Telecommunications

3 Novel Opportunistic Interference Mitigation Schemes for Heterogeneous Networks
Deyue Zhang, Hui Gao, Yuan Ren, Tiejun Lv, Beijing University of Posts and Telecommunications; Chau Yuen, Singapore University of Technology and Design

4 Experimental Verification of Interference Mitigation techniques for 5G Small Cells
Dereje Assefa Wassie, Gilberto Berardinelli, Fernando Tavares, Troels B. Sørensen, Aalborg University; Preben E. Mogensen, Nokia Networks

5 Interference Alignment with Limited Feedback for Macrocell-Femtocell Heterogeneous Networks
Mohamed Rihan, Maha Elsabrouty, Egypt-Japan University for Science and Technology; Osamu Muta, Hiroshi Furukawa, Kyushu University

Thursday, 14 May 2015 10:30-12:00 Conference Room 6

7D: Self-Organisation and Collaboration

Chair: Rafael Cepeda, InterDigital UK

1 Self Coordination among SON functions in LTE Heterogeneous Networks
Jessica Moysen, Lorenza Giupponi, CTTC

2 Self Organized Physical Cell ID Assignment in Multi-operator Heterogeneous Networks
Furqan Ahmed, Olav Tirkkonen, Aalto University

3 Joint Mobility Load Balancing and Inter-cell Interference Coordination for Self-Organizing OFDMA Networks
Nur Öykü Tuncel, Mutlu Koca, Bogazici University

4 Dynamic Frequency Self-optimization for Dense WLAN
Hongcheng Zhuang, Beletskiy Andrian, Zezhou Luo, Jietao Zhang, Youwen Yi, Huawei Technologies Co., Ltd.

5 Collaborative Anti-jamming Broadcast with Uncoordinated Frequency Hopping over USRP
GuiquanChen, Yan Li, Liang Xiao, Lianfen Huang, Xiamen University

Thursday, 14 May 2015 10:30-12:00 Conference Room 7

7E: mmW Communications and Massive MIMO

Chair: Jordi Perez-Romero, Universitat Politecnica de Catalunya

1 Equalization for outdoor mmW deployments
Monisha Ghosh, Magdalena Bielinski, Steven Ferrante, InterDigital

2 Adaptive Peak-to-Average Power Reduction Architecture for Multicarrier Signals With Mixed Modulations
Alexander Lozhkin, Fujitsu Ltd.; Kazuo, Nagatani

3 Practical Demonstration of Limited Feedback Beamforming for mmWave Systems
Djamal Eddine Berraki, Thomas Barratt, Mark Beach, Simon Armour, Andrew Nix, University of Bristol

4 A Low-Complexity Linear Precoding Scheme Based on SOR Method for Massive MIMO Systems
Tian Xie, Qian Han, Huazhe Xu, Zihao Qi, Wenqian Shen, Tsinghua University

5 Channel Estimation for Large Antenna Systems
Keying Wu, Alcatel-Lucent Shanghai Bell Co., Ltd; Dong Li, Alcatel-Lucent Shanghai Bell Co., Ltd.

Thursday, 14 May 2015 10:30-12:00 Conference Room 8

7F: Scheduling and Resource Allocation for Cooperative Communications

Chair: Keivan Navaie, University of Leeds

1 Low Complexity User Scheduling Design for Multi-pair Two-Way Relay Channels
Wang Yan, Hui Gao, Beijing University of Posts and Telecommunications; Chau Yuen, Singapore University of

Technology and Design; Tiejun Lv, Beijing University of Posts and Telecommunications

2 **Joint Cell Assignment and Scheduling for Centralized Baseband Architectures**
Victor Fernandez-Lopez, Aalborg University; Beatriz Soret, Nokia; Klaus I. Pedersen, Nokia Networks

3 **Interference Canceling Power Optimization for Device to Device Communication**
Liang Zhou, Kalle Ruttik, Olav Tirkkonen, Aalto University

4 **Optimal Power Allocation for Coordinated Transmission in Cognitive Radio Networks**
YuefengLi, Zhi Chen, University of Electronic Science and Technology of China; Yu Gong, Loughborough University

5 **Resource Allocation for Outdoor-to-Indoor Multicarrier Transmission with Shared UE-side Distributed Antenna Systems**
Marco Breiling, Fraunhofer Institute IIS; Derrick Wing Kwan Ng, University of British Columbia; Christian Rohde, Frank Burkhardt, Fraunhofer Institut IIS; Robert Schober, University British Columbia

Thursday, 14 May 2015 10:30-12:00 Conference Room 4/5

7Pa: Green Communications and Networks

1 **Impact of Varying Traffic Profile on Phantom Cell Concept Energy Savings Schemes**
Emmanuel Ternon, DOCOMO Euro-Labs; Patrick Agyapong, DOCOMO Communications Laboratories Europe GmbH; Armin Dekorsy, University of Bremen

2 **TAPS: Traffic-Aware Power Saving Scheme for Clustered Small Cell Base Stations in LTE-A**
Kuan-Yu Lin, National Chiao Tung University; Jen-Yeu Chen, National Dong Haw University; Fang-Ching Ren, Industrial Technology Research Institute; Chung-Ju Chang, National Chiao Tung University

3 **Dynamic Pico Switch On/Off Algorithm for Energy Saving in Heterogeneous Networks**
Zhe Jin, Pan Zhiwen, Nan Liu, Li Wanlin, Jiang Wu, University of Southeast; Tianle Deng, Huawei Tech. Co. Ltd.

4 **MOST: Mobile Broadband Network Optimization Using Planned Spatio-Temporal Events**
Saulius Samulevičius, Troels B. Sørensen, Torben Bach Pedersen, Aalborg University

5 **Harvesting Management in Multiuser MIMO Systems with Simultaneous Wireless Information and Power Transfer**
Javier Rubio, Antonio Pascual Iserte, Universitat Politècnica de Catalunya

6 **Power Performance Analysis of the Iterative-MIMO Adaptive Switching Algorithm Detector on the FPGA Hardware**
Nina Tadza, John Thompson, David Laurenson, University of Edinburgh

7 **Smart Small Cell Wake-Up Field Trial: Enhancing End-user Throughput and Network Energy Performance**
Jawad Manssour, Ericsson AB; Pål Frenger, Laetitia Falconetti, Ericsson Research; Sungho Moon, Minsoo Na, SK Telecom

8 **Energy-Efficient Power Allocation in Dynamic Multi-Carrier Systems**
E. Veronica Belmega, ETIS / ENSEA - Univ. Cergy-Pontoise - CNRS; Panayotis Mertikopoulos, CNRS, Univ.Grenoble Alpes, LIG

9 **On Achievable Rates in Massive MIMO-based Hexagonal Cellular System with Pilot Contamination**
Zaka ul Mulk, National University of Sciences and Technology, Islamabad Pakistan; Syed Ali Hassan, National University of Sciences and Technology

Thursday, 14 May 2015 10:30-12:00 Conference Room 4/5

7Pb: Ad-hoc, Mesh, Machine-to-Machine and Sensor Networks

1 **Sensors Deployment Algorithms Under Limited Communication Range and Measurement Error**
Hamid Mahboubi, Mojtaba Vaezi, Fabrice Labeau, McGill University

2 **Optimal Viterbi Algorithm Based 3-D Total Variation Sequence Decoding (3-D TVSD) For Robust Video Reconstruction In Multimedia Wireless Sensor Networks**
Ankit Kudeshia, Aditya K. Jagannatham, Indian Institute of Technology Kanpur

3 **Adaptive Scheduling with Fault Tolerance for Wireless Sensor Networks**
Boucetta Cherifa, University of Manouba; Hanen Idoudi, Leila Azouz Saidane, ENSI

4 **A Fair Polling Scheme for Energy Harvesting Wireless Sensor Networks**
Masashi Kunikawa, Hiroyuki Yomo, Kansai University; Kenichi Abe, Tetsuya ITO, NEC Communication Systems

5 **A Novel Cluster Head Reselection and Edge Sub-Clustering Lifetime Prolongation Scheme for Modern Sensor Networks**
Wenson Chang, Tai-Wei Lin, National Cheng Kung University

6 **Virtual Cell Sectoring for Enhancing Resource Allocation and Reuse in Network Controlled D2D Communication**
Raja Rajesh Sattiraju, Andreas Klein, Lianghai Ji, Nandish P. Kuruvatti, Hans Schotten, University of Kaiserslautern; Chan Zhou, Ömer Bulakci, Josef Eichinger, Huawei European Research Center

7 **Joint Power Allocation and Reuse Partner Selection for Device-to-device Communications**
Lukai Xu, Guanding Yu, Rui Yin, Zhejiang University

8 **Cellular Content Download Through a Vehicular Network: I2V Link Estimation**
Ghayet El Mouna Zhioua, Houda Labiod, Telecom ParisTech; Nabil Tabbane, Sami Tabbane, Sup'Com Tunis

Thursday, 14 May 2015 13:30-15:00 Conference Room 1

8A: Vehicular Applications, Driver Assistance and Adaptive Traffic Lights

Chair: Haris Kremo, Toyota InfoTechnology Ctr Co.,Ltd.

1 **Stop Line Detection Using Satellite-Image Segmentation**
Valentin Protschky, Paul Seifert, Stefan Feit, BMW Group

2 **Disrupting Adaptive Traffic Lights Cycles through Selective Jamming Attacks**
Heather Hinze, Texas State University; Mike Ruth, University at Buffalo; Mina Guirguis, Texas State University

3 **On the Potential of Floating Car Data for Traffic Light Signal Reconstruction**
Valentin Protschky, Stefan Feit, BMW Group; Claudia Linnhoff-Popien, LMU Munich

4 **Intersection Collision Avoidance: From Driver Alerts to Vehicle Control**
Michael Maile, Luca Delgrossi, Qi Chen, Graham Brown, Mercedes-Benz Research & Development North America, Inc.

5 **Exploration of Centralized Car2X-Systems over LTE**
Markus Mazzola, Gunther Schaaf, Frank Niewels, Robert Bosch GmbH; Thomas Kürner, Technische Universitaet Braunschweig

Thursday, 14 May 2015 13:30-15:00 Conference Room 2

8B: Localisation and Positioning Algorithms

Chair: Seung-Hyun Kong, KAIST

1 **Interference Effect on Localization Solutions: Signal Feature Perspective**
Arash Behboodi, Technische Universität Berlin; Niklas Wirström, SICS Swedish ICT; Filip Lemic, Technische Universität Berlin; Thiemo Voigt, SICS; Adam Wolisz, Technical University of Berlin

2 A TOA-Based Geolocation Algorithm Utilizing Convex Combination
Xiaorui Gong, Jianhua Peng, Kaizhi Huang, NDSC

3 Cluster-based Multi-Target Localization under Partial Observations
Yue Wang, Huawei Technologies Co., Ltd.; Shulan Feng, Hisilicon Technologies, Huawei; Philipp Zhang, Huawei Technologies Co., Ltd.

4 Methodology for GPS Synchronization Evaluation with High Accuracy
Zan Li, Torsten Braun, Desislava Dimitrova, University of Bern

5 Reducing localisation overhead: a ranging protocol and an enhanced algorithm for UWB-based WSNs
Réjane Dalcé, Adrien van den Bossche, Thierry Val, University of Toulouse II - Jean Jaures

Thursday, 14 May 2015 13:30-15:00 Main Auditorium B

8C: Heterogeneous Networks II

Chair: Jose Edson Vargas Bautista, Qualcomm

1 Analytical performance evaluation of OFDMA-based heterogeneous cellular networks using FFR
Jan García-Morales, Guillem Femenias, Felip Riera-Palou, University of the Balearic Islands

2 Channel Parameters and Throughput Predictions for MmWave and LTE-A Networks in Urban Environments
Nor Fadzilah Abdullah, Djamal Eddine Berraki, Araz Ameen, Simon Armour, Angela Doufexi, Andrew Nix, Mark Beach, University of Bristol

3 Prioritized Centrally-Controlled Resource Allocation in Integrated Multi-RAT HetNets
Mikhail Gerasimenko, Dmitri Moltchanov, Roman Florea, Tampere University of Technology; Nageen Himayat, Intel; Sergey Andreev, Yevgeni Koucheryavy, Tampere University of Technology

4 A User-Pairing Power Control Algorithm in Two-tier HetNet
Xiaomeng Chai, Zhangsiyu, Tianyu Zhang, Zhongshan Zhang, University of Science and Technology

5 Uptilted Macros as an Outdoor Solution for Indoor Users in High Rise Buildings
Laura Luque Sanchez, Aalborg University; Benny Vejlgaard, Nokia; P. E. Mogensen, Nokia Solutions & Networks

Thursday, 14 May 2015 13:30-15:00 Conference Room 6

8D: Cloud Systems and Data Mining

Chair: Jen-Yeu Chen, National Dong Haw University

1 An SMDP-based Resource Management Scheme for Distributed Cloud Systems
Jiadi Chen, Hang Long, Qiang Zheng, Xing Minyao, Wenbo Wang, Beijing University of Posts and Telecommunications

2 The Fog Balancing: Load Distribution for Small Cell Cloud Computing
Jessica Oueis, CEA-Leti; Emilio Calvanese Strinati, CEA-LETI MINATEC; Sergio Barbarossa, Sapienza University of Rome

3 A Failure-Tolerant and Spectrum-Efficient Wireless Data Center Network Design for Improving Performance of Big Data Mining
Katsuya Suto, Hiroki Nishiyama, Nei Kato, Tohoku University; Takayuki Nakachi, Toshikazu Sakano, Atsushi Takahara, NTT Network Innovation Laboratories

4 Anomaly Detection Algorithms for the Sleeping Cell Detection in LTE Networks
Sergey Chernov, Michael Cochez, Tapani Ristaniemi, University of Jyväskylä

5 Systematic Raptor Codes-based Multipath Multimedia Transport Protocol over HetNets
Oh Chan Kwon, Yunmin Go, Hwangjun Song, POSTECH

Thursday, 14 May 2015 13:30-15:00 Conference Room 7

8E: Network MIMO, Distributed Beamforming and Space-time Coding

Chair: Riichi Kudo, NTT Corporation

1 CSI Compression and Feedback for Network MIMO
Martin Kurras, Stephan Jaeckel, Lars Thiele, Fraunhofer Heinrich Hertz Institute; Volker Braun, Bell Labs, Alcatel-Lucent

2 A Low Complexity Quantization Technique for Virtual MIMO Systems
Miryam Gonzalez-Perez, John Thompson, University of Edinburgh

3 A Distributed Relay Beamforming-enhanced TDMA System
Muhammad Mahboob Ur Rahman, KTH; Muhammad Ahmed Salim, Imperial University, Lahore; Aneela Yasmeen, The University of Iowa; James Gross, Royal Institute of Technology (KTH)

4 A Partial PIC Based Receiver Design for SFBC-OFDM Cooperative Relay Systems
Chin-Liang Wang, Jia-Li Chen, Shun-Sheng Wang, National Tsing Hua University

Thursday, 14 May 2015 13:30-15:00 Conference Room 8

8F: Multiple Access

Chair: Hang Nguyen, Institut MinesTelecom - Telecom SudParis

1 Playing with Blocks: A New Combination of Block Transmission and the CDMA Multiple Access Technique
Leonel Arevalo, Raimundo Sampaio-Neto, PUC-RIO

2 Uplink NOMA with Multi-Antenna
Beomju Kim, Wonsuk Chung, Yonsei University; Sungmook Lim, Korea National University of Transportation; Sangwook Suh, Samsung; Jonghyung Kwun, Samsung Advanced Institute of Technology; Sooyong Choi, Daesik Hong, Yonsei University

3 Outage Analysis of Full-Duplex Architectures in Cellular Networks
Constantinos Psomas, Ioannis Krikidis, University of Cyprus

4 A Joint Access Policy Scheme with Matrix of Conflict RRM for Enhancing Femtocell Network Utilization
Wahyu Pramudito, Emad Alsusa, Daniel K C So, Khairi Hamdi, University of Manchester

5 Is MAC Joint Decoding Optimal for Interference Channels?
Guangxia Zhou, Hamburg University of Technology; Wen Xu, Intel; Gerhard Bauch, Hamburg University of Technology

Thursday, 14 May 2015 13:30-15:00 Main Auditorium C

8H: Interference Management II

Chair: Tolga Girici, TOBB Univ. of Econ. & Tech.

1 Interference Mitigation using Band Selection for Network-assisted D2D Communications
Carlos Silva, Rodrigo Batista, José Mairton B. da Silva Jr., Tarcisio F. Maciel, Francisco Rodrigo Porto Cavalcanti, Wireless Telecom Research Group (GTEL), Federal University of Ceara

2 On Enhancing Almost Blank Subframes Management for efficient eICIC in HetNets
Katerina Koutlia, Jordi Perez-Romero, Ramon Agusti, Universitat Politecnica de Catalunya (UPC)

3 A Multi-Level Interference Mapping Technique for Resource Management in Cellular Networks
Aysha Ebrahim, Emad Alsusa, University of Manchester

4 Experimental Evaluations of Coordinated Interference Control for Co-channel Overlaid Cell Structure
Atsushi Nagate, Sho Nabatame, Kenji Hoshino, Teruya Fujii, Softbank Mobile Corp.

5 Study of Dynamic eICIC in a Realistic Urban Deployment
Klaus I. Pedersen, Nokia Networks; Beatriz Soret, Nokia; Sonia Barcos, Guillermo Pocovi, Hua Wang, Aalborg University

Thursday, 14 May 2015 13:30-15:00 Conference Room 4/5

8P: Wireless Networks, Applications and Security

1 **A SVD-Based Optimum Algorithm Research for Macro-Femto Cell Interference Coordination**
Kaiyue Yan, Yan Yang, Beijing Jiaotong University; Shuping Dang, University of Oxford

2 **On the Mobility of Moderate Speed Users in Ultra Dense Small Cell Deployments with mmW**
Mohammad Joud, Mario Garcia-Lozano, Silvia Ruiz, Universitat Politècnica de Catalunya

3 **Analysis of Pilot Contamination on the Security Performance of Artificial Noise in MIMO Systems**
Shengbin Lin, Kaizhi Huang, Wenyu Luo, Yi Zou, NDSC

4 **Physical Layer Security Over OFDM-Based Links: Conjugate-and-Return**
David E. Simmons, University of Oxford; Nidhi Bhargav, Queen's University Belfast; Justin Coon, University of Oxford; Simon L. Cotton, Queen's University Belfast

5 **Optimal Transmit Design at Relay Nodes for Secure AF Relay Networks**
Lingxiang Li, University of Electronic Science and Technology of China; Liu Li, Chongqing University of China; Zhi Chen, Jun Fang, University of Electronic Science and Technology of China

6 **Achieving Optional Android Permissions without Operating System Modifications**
Greig Paul, James Irvine, University of Strathclyde

7 **Robustness of Location Based D2D Resource Allocation Against Positioning Errors**
Nandish P. Kuruvatti, Andreas Klein, Lianghai Ji, Raja Rajesh Sattiraju, Hans Schotten, University of Kaiserslautern; Chan Zhou, Ömer Bulakci, Josef Eichinger, Huawei European Research Center

8 **Computationally-efficient estimation of throughput indicators in heterogeneous LTE networks**
Jose Angel Fernandez Segovia, Salvador Luna Ramírez, Matías Toril, University of Málaga; Carlos Úbeda Castellanos, Ericsson Spain

9 **Opportunistic Transmission Scheduling for Secure Wireless Links: An Optimal Stopping Approach**
Marios I. Poulakis, Stavroula Vassaki, Athanasios Panagopoulos, National Technical University of Athens

10 **Spatial-Temporal Analysis of Erlang Measurement in Large-Scale GSM Cellular Networks**
Yanqin Zhang, Sihai Zhang, Wuyang Zhou, University of Science and Technology of China

11 **Multicast Burst Forwarding in Constrained Networks**
Badis Djamaa, Mark Richardson, Peter Barker, Cranfield University; Aissani Mohamed, University Paris XII

12 **Detection of Jamming Attacks over Smartphones**
Guolong Liu, Jinliang Liu, Yan Li, Liang Xiao, Yuliang Tang, Xiamen University

13 **An On-line Decoding Algorithm for 3GPP MBMS Raptor Codes**
Yanling Xing, Ge Ning, Tsinghua University

14 **A Distributed Framework for Content Based Dissemination in Vehicular P2P Environments**
Smitha Shivshankar, Abbas Jamalipour, University of Sydney

15 **Using Information Centric Networking for Mobile Devices Cooperation at the Network Edge**
Fabio Malabocchia, Telecom Italia SpA; Romeo Corgiolu, Telecom Italia; Maurizio Martina, Politecnico di Torino; Andrea Detti, Bruno Ricci, Nicola Blefari-Melazzi, Università di Roma 'Tor Vergata'

16 **A General Upper Bound to Evaluate Interference-aware Outage Performance for Multiple Cooperative Multicast Groups**
Hongyun Chu, Pingping Xu, Southeast University; Chencheng Yangy, Purdue University; Suheng Zhang, University of New South Wales

17 **Performance Gains of a Hybrid Wi-Fi/LTE Architecture**
Jonathan Ling, Olivier Marce, Satish Kanugovi, Subramanian Vasudevan, Alcatel-Lucent

18 **Analysis of Heterogeneous Networks with Dual Connectivity in a Realistic Urban Deployment**
Guillermo Pocovi, Sonia Barcos, Hua Wang, Aalborg University; Klaus I. Pedersen, Claudio Rosa, Nokia Networks

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Thursday, 14 May 2015 15:30-17:00 Conference Room 1

9A: Vehicular Networking, MAC and Security Protocols

Chair: Haris Kremo, Toyota InfoTechnology Ctr Co.,Ltd.

1 **An Intelligent Broadcast Protocol for VANETs Based on Transfer Learning**
Celimuge Wu, The University of Electro-Communications; Xianfu Chen, VTT Technical Research Centre of Finland; Yusheng Ji, National Institute of Informatics; Satoshi Ohzahata, Toshihiko Kato, The University of Electro-Communications

2 **Performance Evaluation of ETSI GeoNetworking for Vehicular Ad hoc Networks**
Sebastian Kühlmorgen, Ignacio Llatser, Andreas Festag, Gerhard Fettweis, Technische Universität Dresden

3 **Adaptive Contention Window Scheme to Improve Multi-hop Broadcast in VANETs**
Adel Berradj, Zoubir Mammeri, IRIT University Paul Sabatier, France

4 **Secure Cluster-based In-network Information Aggregation for Vehicular Networks**
Stefan Dietzel, Ulm University; Andreas Peter, University of Twente; Frank Kargl, University of Ulm

5 **Impact of Slot-Multiplexing on the Message Scheduling and Timing Analysis of FlexRay Dynamic Segment**
Zhan-Yao Gu, National Tsinghua University; Yarsun Hsu, National Tsing Hua University

Thursday, 14 May 2015 15:30-17:00 Conference Room 2

9B: Satellite Systems and Models

Chair: Jaroslaw Sadowski, Gdansk University of Technology

1 **A Comparison of Statistical and Geometric Models for the Dual Polarised MIMO Land Mobile Satellite Channel**
Fiona Ni Mhearain, Mathini Sellathurai, Heriot-Watt University; Fernando Perez Fontan, University of Vigo

2 **Capacity Analysis of Two-Layered LEO/MEO Satellite Networks**
Runzi Liu, Min Sheng, Xidian University; King-Shan Lui, University of Hong Kong; Xijun Wang, Di Zhou, Yu Wang, Xidian University

3 **IEEE 1609 Influenced Automatic Identification System (AIS)**
Jack Hall, Jordan Lee, Joseph Benin, Christopher Armstrong, United States Coast Guard Academy; Henry Owen, Georgia Institute of Technology

4 **Performance of DS-CDMA Radionavigation Receiver with Subsample Time Measurement Resolution in Various Environments**
Jaroslaw Sadowski, Gdansk University of Technology

Thursday, 14 May 2015 15:30-17:00 Main Auditorium B

9C: Heterogeneous Networks III

Chair: John Thompson, University of Edinburgh

1 **Autonomous load balancing of heterogeneous networks**
Per Kreuger, Olof Görnerup, Daniel Gillblad, Swedish Institute of Computer Science; Tomas Lundborg, Ericsson System Field Performance; Diarmuid Corcoran, Andreas Ermedahl, Ericsson AB

2 Resource Partitioning in Heterogeneous Network based on Bargaining Theory
Byung Chang Chung, Dong-Ho Cho, KAIST

3 Fast Cell Search Method Using PSS and SSS Based on Frequency Offset Estimation for Heterogeneous Networks with Separate Frequency Spectrum
Naoki Noguchi, Tokyo City University; Satoshi Nagata, NTT DOCOMO, INC.; Mamoru Sawahashi, Tokyo City University

4 Flow-Level Capacity and Performance in HetNets
Sem Borst, Bell Labs, Lucent Technologies; Hajo Bakker, Alcatel-Lucent Bell Labs Stuttgart; Markus Gruber, Alcatel-Lucent Bell Labs Germany; Siegfried Klein, Alcatel-Lucent Bell Labs; Phil Whiting, Macquarie University

5 Inter-eNB Flow Control for Heterogeneous Networks with Dual Connectivity
Hua Wang, Aalborg University; Claudio Rosa, Klaus I. Pedersen, Nokia Networks

Thursday, 14 May 2015 15:30-17:00 Conference Room 6

9D: Physical Layer Security and Cryptography

Chair: Chunlin Yan, DOCOMO Beijing Communications Laboratories

1 Adaptive Physical Layer Security Framework for Wireless Systems
Özge Cepheli, Istanbul Technical University; Volker Luecken, Guido Dartmann, RWTH Aachen University; Gunes Kurt, Istanbul Technical University; Gerd Ascheid, RWTH Aachen University

2 Analysis of Information-guided Transmit Antenna Selection for Security Enhancement
Hu Yujia, Beijing University of Posts and Telecommunications

3 Robust Beamforming Techniques for MISO Secrecy Communication with a Cooperative Jammer
Zheng Chu, Martin Johnston, Stephane Le-Goff, Newcastle University

4 Alternating Optimization for MIMO Secrecy Channel with a Cooperative Jammer
Zheng Chu, Martin Johnston, Stephane Le-Goff, Newcastle University

5 Secret Key Generation Based on AoA Estimation for Low SNR Conditions
Ahmed Badawy, Politecnico di Torino; Tamer Khattab, Tarek Elfouly, Amr Mohamed, Qatar University; Daniele Trinchero, Carla Fabiana Chiasserini, Politecnico di Torino

Thursday, 14 May 2015 15:30-17:00 Conference Room 7

9E: Performance Analysis of Cooperative Communications

Chair: Nalin Jayakody, University of Tartu

1 A Jointly Probabilistic Approach of Performance Analyses for Cooperative Relaying Links
John F. An, Chia-Hao Wu, National Taiwan Ocean University

2 On the Linear Combination of Gamma Conditionally Gaussian Distributions with Application to Decode and Forward Cooperation
G V V Sharma, IIT Hyderabad; Sachin Kumar, Cognizant Technologies; A Rathnakar, IIIT Basara

3 DMT for the Relay assisted Interference Cancellation over Nakagami-m Fading Channel
Rajendra Prasad Sirigina, A.S. Madhukumar, Nanyang Technological University

4 Amplify-and-Forward Relay Networks with Underlay Spectrum Access over Frequency Selective Fading Channels
Hoc Phan, University of Reading; Chu Thi My Chinh, Blekinge Institute of Technology; Fuchun Zheng, The University of Reading

5 Performance of Co-operative Uplink Reception with Non-Ideal Backhaul
Deepak Pengoria, Shirish Nagaraj, Rajeev Agrawal, Nokia Networks

Thursday, 14 May 2015 15:30-17:00 Conference Room 8

9F: Receiver Design

Chair: Ismail Kaya, Karadeniz Technical University

1 On the Theoretical BER Performance of SC-FDE Schemes with IB-DFE Receivers
Filipe Casal Ribeiro, ISCTE-IUL; Rui Dinis, Universidade Nova de Lisboa; Francisco Cercas, Instituto de Telecomunicações; Adão Silva, Instituto de Telecomunicações / University of Aveiro

2 Decoding-Aided Parameter Estimation for Interference Cancellation and Suppression Receivers in LTE-Advanced Systems
Gregory Morozov, Intel; Alexei Davydov, Intel Corporation

3 An Enhanced Compressed Sensing-based Interference-resistant Receiver for LTE Systems
Kyle Jung-Lin Pan, InterDigital; Lingchen Zhu, Georgia Institute of Technology; Tanbir Haque, InterDigital; James H. McClellan, Georgia Institute of Technology

4 Receiver Technique for Detection and Correction of Nonlinear High Power Amplifier Distortion Errors in OFDM systems
Hanen Bouahadda, Rafik Zayani, Innov'COM/Sup'Com; Hmaied Shaiek, CNAM-Paris; Daniel Roviras, CNAM; Ridha Bouallegue, Innov'COM/Sup'Com

5 Universal Receiver for Weighted Circularly Convolved OFDM/OQAM
Javad Abdoli, Ming Jia, Jianglei Ma, Huawei Technologies Canada Co., Ltd.

Thursday, 14 May 2015 15:30-17:00 Main Auditorium C

9H: Small Cells

Chair: Keivan Navaie, University of Leeds

1 Hypergraph-Based Intercell Interference Coordination for QoS Guarantees in Dense Femtocell Networks
Jinbo Liu, Beihang University; Shaohui Sun, Jiamin Liu, Yuan He, State Key Laboratory of Wireless Mobile Communications, CATT

2 Network-Listening Based Synchronization with Loop-Back Interference Avoidance for Small Cells in LTE-Advanced
Mitsukuni Konishi, Daigo Ogata, Atsushi Nagate, Teruya Fujii, Softbank Mobile Corp.

3 Low-Complexity Interference-Free Downlink Channel Assignment with Improved Performance in Coordinated Small Cells
Redha M. Radaydeh, Alfaisal University; Ammar Zafar, King Abdullah University of Science and Technology; Fawaz Al-Qahtani, Texas A & M University at Qatar; Mohamed-Slim Alouini, KAUST

4 QoS-aware Admission Control for OFDMA Femtocell Networks under Fractional Frequency based Allocation
Mouna Hajir, Francois Gagnon, Ecole de Technologie Superieure de Montreal

5 Investigation on Inter-Cell Interference Cancellation Scheme for Small-Cell User Equipments in Heterogenous Networks Employing Cell Range Expansion
Masayuki Miyashita, Manabu Mikami, Teruya Fujii, Softbank Mobile Corp.

Thursday, 14 May 2015 15:30-17:00 Conference Room 4/5

9P: Wireless Access

1 Resource Sharing with Minimum QoS Requirements for D2D Links Underlaying Cellular Networks
Bernd Holfeld, Tobias Jaeuthe, Thomas Wirth, Fraunhofer Institute for Telecommunications, Heinrich-Hertz-Institut

2 Group_RNTI for Multi-users Multiplexing Radio Voice Transmission for Enhancing Voice Capacity over LTE in PMR Context
Manh-Cuong Nguyen, Hang Nguyen, Institut Télécom SudParis; Eric Georgeau, Philippe Mege, Laurent Martinod, Cassidian Systems

3 Symbol Timing Offset Mitigation in OFDMA-Based CoMP Utilizing Position Aware Transmission
Tuan Le, Middlesex University London; Tejas Gherkar, Anite Ltd; Mohammad Reza Nakhai, Kings College London; Keivan Navaie, Lancaster University

4 On the Waveforms for 5G Mobile Broadband Communications
Jaakko Vihriälä, Nokia Networks; Natalia Ermolova, Aalto University; Eeva Lähetkangas, Nokia Networks; Olav Tirkkonen, Aalto University; Kari Pajukoski, Nokia Networks

5 Fast Distortion Estimation Based on Structural Similarity for H.264/SVC Encoded Videos
Fulvio Babich, Massimiliano Comisso, Riccardo Corrado, University of Trieste

6 A Cell Identification Performance Improvement in Co-Channel Heterogeneous Cellular Networks with Cell Range Expansion
Manabu Mikami, Masayuki Miyashita, Hitoshi Yoshino, Softbank Mobile Corp.

7 Collision-free Packet Retransmission Protocol for Wireless CSMA Systems
Kazyuki Ozaki, Takayoshi Nakayama, Yun Wen, Hiroshi Fujita, Fujitsu Laboratories Ltd.

8 Channel Access Acquisition Mechanism Coupled with Cellular Network for Unlicensed Spectrum
Riichi Kudo, B. A. Hirantha Sithira Abeysekera, Yasushi Takatori, Takeo Ichikawa, Masato Mizoguchi, NTT Corporation; Hiroto Yasuda, Akira Yamada, Yukihiko Okumura, NTT DoCoMo, Inc

9 Uplink Load Balancing over Multipath Heterogeneous Wireless Networks
Oscar Delgado, Fabrice Labeau, McGill University

10 A Closed-Loop UL Power Control Scheme for Interference Mitigation in Dynamic TD-LTE Systems
Qinqin Chen, Hui Zhao, Lin Li, Hang Long, Beijing University of Posts and Telecommunications; Jianquan Wang, China Unicom Research Institute; Xiaoyue Hou, Beijing University of Posts and Telecommunications

11 Channel-Oriented Channel Allocation Scheme (COCAS) for Multi-Antenna OFDMA Femtocells
Ang-Hsun Tsai, National Defense University; Li-Chun Wang, National Chiao Tung University

12 Joint Subcarrier and Power Allocation for Sum-Rate Maximization in OFDMA Full-Duplex Systems
Ali Cagatay Cirik, Kari Rikkinen, Matti Latva-aho, University of Oulu

13 Resource Allocation Algorithm for VoLTE with Semi-Persistent Scheduling
Xin Lv, Xinyu Gu, Xin Deng, Zhang Lin, Beijing University of Posts and Telecommunications; Wenyu Li, China Academy of Telecommunication Research

14 Unsupervised system for diagnosis in LTE networks using Bayesian Networks
Lydia Flores, Ana Gómez Andrades, Raquel Barco, University of Málaga; I. Serrano, Ericsson

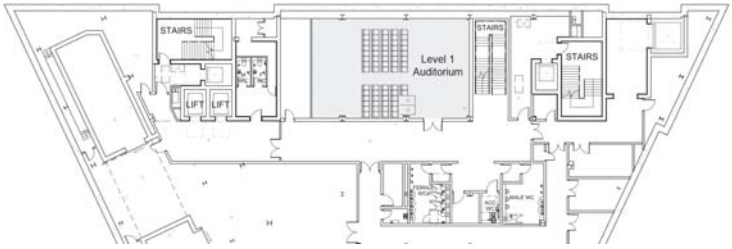
15 Coordinated Scheduling for Advanced UE Receivers using Belief Propagation
Balamurali Natarajan, Nokia Networks

16 RSRP-based LTE-WLAN traffic steering
Irina Balan, Daniela Laselva, Simone Redana, Andreas Lobinger, Nokia

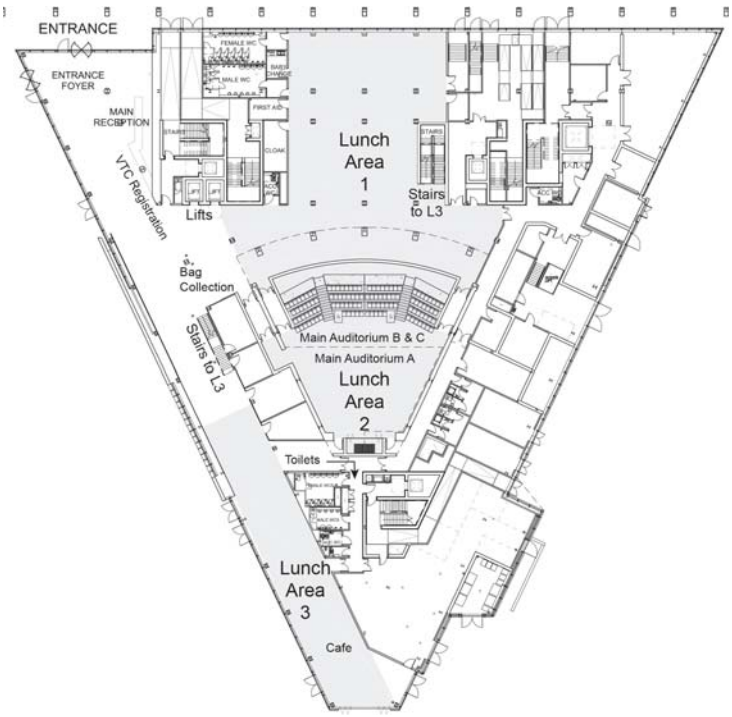
17 HARQ in Poisson Point Process-based Heterogeneous Networks
Chao Fang, Behrooz Makki, Chalmers University of Technology; Yateng Hong, Xiaodong Xu, Beijing University of Posts and Telecommunications; Tommy Svensson, Chalmers University of Technology

18 Pilot Adaptation for Broadband LTE-Like FBMC System in PMR Band
Vincent Savaux, C. Faouzi Bader, Supélec

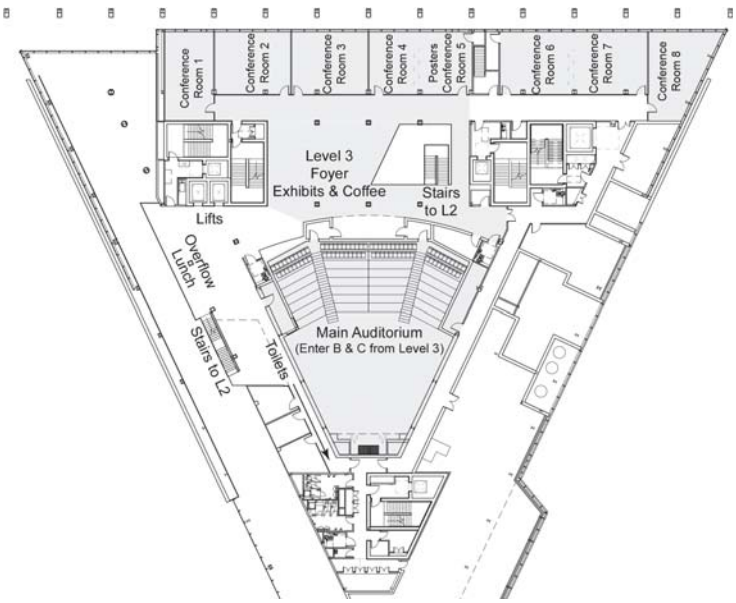
Conference Floorplans



Level 1: Tuesday & Wednesday Panels



Level 2: Lunch



Level 3: Main level of Conference

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Barry Einsig
Global Transportation Executive, Cisco Systems

Wen Tong
Head Wireless Research Comms Technologies Labs, Huawei

Kaveh Pahlavan
Professor & Wireless Pioneer,
Worcester Polytechnic Institute

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