



*The 80th IEEE
Vehicular Technology Conference*

Final Programme



14 – 17 September 2014

Vancouver, Canada

Welcome from the General Co-chairs

On behalf of the IEEE 80th Vehicular Technology Conference (VTC), IEEE VTC2014-Fall, and the many talented and dedicated volunteers and staff who have contributed their time and effort, we welcome you to Vancouver!

Innovation is both a central theme of IEEE VTC2014-Fall and an important element of the planning that has gone into the conference. We have constructed a superb technical program as discussed in the welcoming remarks by Robert Schober and Aaron Gulliver, our Technical Program Co-Chairs. In addition, we have added two significant new elements:

1. We are the first VTC to use a mobile app to communicate the conference agenda to attendees. The IEEE VTC2014-Fall Mobile App will display the conference schedule, share session details and conference venue maps, and allow you to set session reminders and share your experience.
2. We are the first VTC to arrange a continuous track of presentations by industry experts over three theme days. We have effectively attached an industry conference onto the traditional VTC technical program. The target audience for these tracks include both regular conference attendees and engineers from industry.

Here is how the new Industry Track will unfold:

On Monday, 15 September, we will host 5G Wireless Day. Co-chaired by Ibrahim Gedeon of TELUS, and Peiyang Zhu of Huawei Canada, 5G Wireless Day will feature keynote presentations, sessions on

Wireless System Planning Tools, Millimetre Wave Access, The Challenge of Defining 5G, and a special evening session on Wireless Technologies for Freight and Asset Tracking.

On Tuesday, 16 September, we will host Autonomous and Connected Vehicles Day. Co-chaired by Barrie Kirk of the Canadian Automated Vehicles Center of Excellence (CAVCOE) and David Atnikov of Novax Industries, Autonomous and Connected Vehicles Day will feature keynote presentations, sessions on Autonomous Vehicles and Connected Vehicles, and a Panel Discussion.

On Wednesday, 17 September, we will host Electric Vehicle and Vehicular Electronics Day. Co-chaired by Lee Stogner of the IEEE Transportation Electrification Initiative (TEI) and David Michelson of the University of British Columbia, Electric Vehicle and Vehicular Electronics Day will feature keynote presentations, a session on Electric Vehicle Charging Initiatives in BC, and a Workshop on Automotive EMC.

We look forward to an exciting IEEE VTC2014-Fall conference and hope that our innovations will enhance your technology experience. We also hope that you will be able to find time before or after the conference to enjoy the many exciting experiences that Vancouver has to offer.

David G. Michelson and Ibrahim J. Gedeon
General Co-chairs, IEEE VTC2014-Fall

Welcome from the TPC Co-chairs

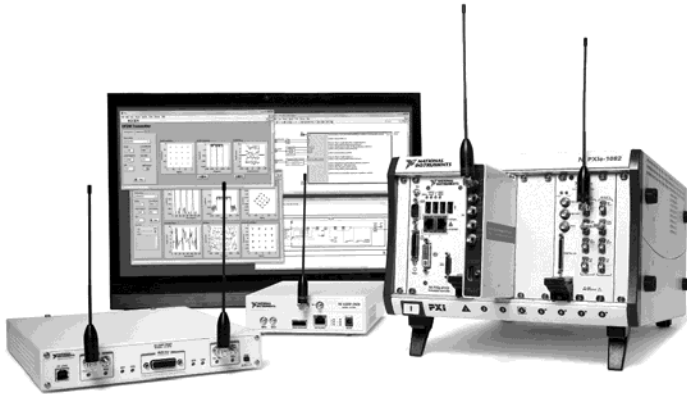
On behalf of the technical program committee of the IEEE 80th Vehicular Technology Conference (VTC), we would like to welcome you to Vancouver, one of the most beautiful cities in the world. We believe we have assembled an exciting technical program with high quality papers that provide new insights, present thought-provoking new ideas, and significantly advance the state of the art. The program is divided into 13 regular tracks, with each track targeting one specific aspect of vehicular technology research, and one recent results track, which reports the latest research results in the VTS community.

All 824 submitted papers went through a rigorous review process and each paper was evaluated by at

least three independent reviewers. Only papers that had an overall score of more than 3 out of 5 were considered for acceptance and after much deliberation and additional reviewing by the track co-chairs, 437 papers were finally accepted. In this context, we would like to particularly thank the 44 track TPC co-chairs who volunteered a considerable amount of their time and expertise to ensure a fair, rigorous, and timely review process. Furthermore, we would like to thank the more than 600 TPC members for finding competent reviewers and for reviewing many of the submitted papers themselves. We are also grateful to the reviewers for providing fair evaluations of the merits of the papers and valuable

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feedback to the authors. Last but not least, we would like to thank the authors for submitting their work to VTC2014-Fall, which has allowed us to assemble a high quality technical program.

Although the excellent technical presentations, panels, tutorials, and keynotes as well as the networking with colleagues will certainly capture much of your attention, we hope you still will have time to explore the many beautiful sites and interesting activities that Vancouver has to offer. Famous sites such as Stanley Park, Grouse Mountain, Steveston Harbor, and the University of British Columbia (UBC) campus as well as world-class

institutions such as Science World and the Vancouver Aquarium and sandy beaches are only minutes away from downtown. Day or half-day trips allow for activities such as whale watching and hiking in the surrounding mountains or visiting the beautiful campuses of Simon Fraser University (SFU) in Burnaby and the University of Victoria (UVic) on Vancouver Island.

We hope you will have a memorable and educational conference and an unforgettable visit to Vancouver!

Aaron Gulliver and Robert Schober,
TPC Co-chairs, IEEE VTC2014-Fall

Welcome from the VTS President

On behalf of the IEEE Vehicular Technology Society, it gives me great pleasure to welcome you to the IEEE 80th Vehicular Technology Conference in Vancouver.

Once again, this edition of VTC will be an opportunity to meet researchers from all over the world who will converge to Vancouver for four days of technical exchanges. For over sixty years this flagship conference of the IEEE Vehicular

Technology Society has been bringing together individuals from academia, government, and industry around the themes of wireless, mobile, and vehicular technology. Since 1999, VTC has been held twice a year; held in Seoul in May 2014, it will move to Glasgow, Scotland in the spring of 2015.

My sincere thanks go to the organizing committee, and in particular to the General Chairs David Michelson and Ibrahim Gedeon, and the Technical

Program Chairs Aaron Gulliver and Robert Schober, along with their respective teams. They have been assembling an exciting and stimulating program of technical sessions, plenaries and workshops, which will expose you to the latest developments in wireless and mobile technology, but will also explore several related areas such as smart grids, electromagnetic compatibility and intelligent transportation systems. The program will also balance academic and industrial viewpoints, through different formats that will allow all participants to take full advantage of their participation in VTC.

This VTC will also be held in an inspiring venue: nestled between the Pacific Ocean and the Rocky Mountains, Vancouver is a city of breathtaking views, cultural diversity and native heritage. It offers all flavours of entertainment and attractions, from the natural beauty of Stanley Park to the more technological charms of several nearby IEEE milestone sites.

I wish you a wonderful experience in this conference, and hope to personally connect or re-connect with as many of you as possible.

Fabrice Labeau, *President*
IEEE Vehicular Technology Society

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Registration

Registration will take place in the Stanley Park Ballroom Foyer. Opening times are:

- Sunday 14 September 2014 07:30 - 17:30*
- Monday 15 September 2014 07:30 - 17:30
- Tuesday 16 September 2014 07:30 - 17:30
- Wednesday 17 September 2014 07:30 - 15:30

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

Breaks

Coffee breaks will take place in the Stanley Park Ballroom on the second floor.

Social Events

Lunches are included as part of the full registration and will be served in Salon DEF of the Bayshore Grand Ballroom on the lobby level. The reception will be conducted on Sunday evening in the Stanley Park Ballroom on the second floor. Again a ticket is required for entry and is included with all registration categories.

The banquet on the evening of Tuesday 16 September 2014 will be aboard the *Magic Spirit Yacht* that we will board at 6:00 pm sharp, and disembark at 9:00 pm. We will board at a dock near the Westin Bayshore (3 minute walk, leave from the west entrance) and cruise the bay. Directions can be found on page 25.

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

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Plenaries

Monday 15 September 2014, 9:00–9:45 (Salon DEF)

A Carrier's View of 5G

Ibrahim Gedeon, *Chief Technology Officer, TELUS, Canada*

Ibrahim Gedeon is the CTO for TELUS, a leading national telecommunications company in Canada. He is responsible for technology strategy, service and network architecture, service delivery and operational support systems, as well as service and network convergence, and network infrastructure strategies and evolution. Under his leadership TELUS deployed the largest LTE cellular network to Canadians to meet the exponential data traffic growth, offering faster speeds to more than 80% of Canadians. Combined with 97% HSPA+ coverage, the TELUS wireless broadband network is one of the best in the world. In 2014, TELUS began the roll out of 4x2 MIMO multi-antenna technology, bringing technology innovation and user experience

to the next level. He has held numerous leadership roles in the IEEE and has received the IEEE Canada's Outstanding Canadian Engineer Award, and serves on the board of a number of industry associations, including the Next Generation Mobile Networks Alliance, the Alliance for Telecommunications Industry Solutions and the Institute for Communication Technology Management. He has a Bachelor's degree in electrical engineering from the American University of Beirut and a Masters' in Electronics Engineering from Carleton University. In 2010, he received a Honorary Doctor of Laws degree from the University of British Columbia.

Monday 15 September 2014, 9:45–10:30 (Salon DEF)

Requirements and Challenges of 5G Wireless

Wen Tong, *Head of Wireless Research, Huawei Technologies, Canada*

Dr. Wen Tong is the Head of Wireless Research, the Communications Technologies Laboratories, and the Huawei 2012 Lab and is a Huawei Fellow. Prior to joining Huawei in March 2009, Dr. Wen Tong was the Global Head of the Network Technology Labs at Nortel and the Nortel Fellow. He received the M.Sc. and Ph.D. degrees in Electrical Engineering in 1986 and 1993 and joined the Wireless Technology Labs at Bell Northern Research in 1995 in Canada. He has pioneered fundamental technologies in wireless with 210 granted US patents. Dr. Tong was Nortel's Most Prolific Inventor. Dr. Tong has conducted the advanced research work spanning from 1G to 4G wireless at Nortel. He had been the director of Wireless Technology Labs from 2005 to 2007. From 2007 to 2009, Dr.

Tong was the head of Network Technology Labs, responsible for Nortel's global strategic technologies research and development. In 2007, Dr. Tong was inducted as Nortel Fellow. Since 2010, Dr. Tong is the vice president and head of Huawei wireless research leading one of the largest wireless research organizations in the industry with more than 700 research experts. In 2011, Dr. Tong is appointed the Head of Communications Technologies Labs of Huawei 2012 LAB, a corporative centralized next generation research initiative. In 2011, Dr. Tong was elected as Huawei Fellow. In 2014, he was elected as an IEEE Fellow. Dr. Tong serves as Board of Director of WiFi Alliance and Board of Director of Green Touch Consortium.

Tuesday 16 September 2014, 8:30–9:15 (Salon DEF)

Automated, Connected and Electric Vehicles: Three Technologies That Will Change the World

Barrie Kirk, *Executive Director, Canadian Automated Vehicles Center of Excellence (CAVCOE)*

Barrie Kirk's current positions and responsibilities include: Executive Director, Canadian Automated Vehicles Centre of Excellence (CAVCOE); Chair, Autonomous Vehicles Task Force, ITS Canada; Partner, Globis Consulting; Member, Canadian Advisory Committee for ISO / TC204 (Intelligent Transportation Systems); Member, Connected Vehicle Technical Committee, ITS Canada. He has worked in the technology industries in Canada, the U.K., and the U.S., including senior management positions at Ottawa-area companies. Barrie has been a consultant since 1982 specializing in the management and

engineering aspects of information and communications technologies, especially ITS, transportation, telematics, telecommunications and satellite communications. His projects over the last few years have focused on autonomous vehicles, connected vehicles, automotive infotainment, traveller information services, real-time traffic information, and vehicle use surveys. Barrie received a B.Sc. (Honours) in Electrical Engineering (Telecommunications and Electronics) from Coventry University, U.K. He is a Professional Engineer licensed by Professional Engineers Ontario.

Tuesday 16 September 2014, 9:15–10:00 (Salon DEF)

The Internet of Everything and Its Impact on the Connected Vehicle Ecosystem

Barry Einsig, *Global Transportation Executive, Cisco Systems, USA*

The Internet of Everything, connecting people, process, data and things is empowering new connectivity, network, application, and security companies to enter the Connected Vehicle Industry. This new ecosystem is bringing with them all of the challenges, opportunities and consumer expectations that came along with

broadband technologies when they entered the service provider industry. We will explore how this next Industrial Revolution will change the Automotive industry much the way the first one did.

Barry Einsig is the Global Transportation Executive for Cisco's Connected Industries Group, responsible for two market categories: Transportation and Public Safety Communications. With a broad experience in the Transportation market, Barry has been in the industry for over 11 years serving in a variety of roles providing wireless communications networks, video, security and life safety systems for Transportation networks. Some of the authorities Barry has worked with include the Washington Metropolitan Area Transit Authority, MTA Maryland, SEPTA, AMTRAK, DART, PA Turnpike, Penn DOT as well as others. He is an active member of the American Public Transportation Association, Association of American Railroads Wireless

Communications Committee, and the Intelligent Transportation Society of America. Within APTA, he is Wireless Communications Committee Chair and the Research and Technology Communications Subcommittee Past Chair. Barry is also active in the Transportation Sector Coordinating Council, APTA Security Standards development, and the Committee on Public Safety. He earned a BA in Environmental Biology from Juniata College and has written for many industry publications. Barry has presented at International Conferences such as IWCE, APCO, ITSA, APTA, and ITS World Congress, on topics including security, wireless communications networks and Intelligent Transportation Systems.

Industry Track

Monday 15 September 2014, 11:00–12:30 (Seymour)

J1: Future Challenges – Mobile Radio Network Design and Optimization

Moderators: **Yann Le Helloco** *InfoVista, Canada*
David Michelson *University of British Columbia, Canada*

Panelists: **Yann Le Helloco** *Senior Vice President & Chief Technical Officer, InfoVista, Canada*
Pascal Chambreuil *Head, Software Team, Orange Labs, France*
Faris Alfarhan *Wireless Systems Engineer, InfoVista, Canada*

As network technologies evolve at a very fast pace, so do all of the techniques, algorithms and methodologies that relate to building and deploying networks based on those technologies. Past technologies have led to a lot of research activities being carried on in areas such as frequency allocation optimization, wave propagation modeling or statistical modeling of network performance, in general covering the fields of predicting and optimizing the performance of the deployed network. This session will review recent progresses in all those areas and will provide multiple insights into challenges to come and research areas in which our knowledge needs to progress.

Dr. Le Helloco oversees the development of the InfoVista products portfolio and he is responsible for technological innovation and strategy as Chief Technical Officer. Prior to joining InfoVista, Dr. Le Helloco was CTO at Mentum, heading R&D and product management activities of the company. He has many years of experience in managing technological, research and R&D teams for various companies including Ericsson, Marconi, Siradel and Cap Gemini. Dr. Le Helloco is an expert in the fields of signal processing, radio wave propagation prediction, mobile and fixed wireless simulation as well as imagery and radar systems. He has over 20 years of experience with most air interface technologies and protocols and has acted as a consultant to many public and private sector organizations including wireless operators and military organizations. An IEEE Distinguished Lecturer, he has authored numerous patents, published many articles and speaks frequently at industry conferences. Yann Le Helloco holds a Ph.D. in signal processing and an MSc in radio communications from the National Institute of Applied Sciences in Rennes, France.

Dr. Pascal Chambreuil holds a PhD in Telecommunication and master degrees in both mathematical modelling and computer sciences. He has been highly involved in Orange network design and optimization processes for more than fifteen years. He has also been working on research projects on interference modelling, combinatorial optimization and multi-criteria decision support

systems. After directing several projects on frequency planning, radio performance diagnosis and architecture optimization, he took charge of the radio planning software product line of Orange Labs. He also contributed, as a design and optimization expert, to some strategic engineering projects like UMTS900 or LTE1800 deployment. He is now the head of the Optimization & Planning Software team at Orange Labs.

Faris Alfarhan is a wireless systems engineer in the research and specifications team at InfoVista in Gatineau, Canada. He is in charge of researching and validating advanced radio access network planning and optimization algorithms, along with defining product requirements and specifications for InfoVista's radio network planning and optimization software. Faris received a bachelor's degree in electrical engineering from McGill University, Montreal, Canada; and a master's degree in wireless communications and radio access networks from the University of Toronto, Canada. Faris has developed his expertise in advanced radio access networks from his current and previous roles as a wireless systems engineer at InfoVista and InterDigital, and a research assistant at the University of Toronto. His domains of interest and expertise include wireless network design and optimization, network performance simulations, network resource allocation algorithms, advanced MIMO schemes, and new disruptive technologies.

Monday 15 September 2014, 14:00–15:30 (Seymour)

J2: Millimetre-Wave Access Technologies for 5G

Chair: **David Michelson** *University of British Columbia, Canada*
 Yi Wang *Huawei Technologies, China*

Panelists: **Yves Lostanlen,** *CEO, Siradel North America, Canada*
 David Wessel *RF Design Engineer, Huawei Technologies, Canada*
 Rapeepat Ratasuk *Wireless Research Engineer, Nokia Solutions and Networks, USA*

It is widely expected that 5G will be the first generation of wireless technology to exploit the vast amounts of spectrum available at frequencies above 30 GHz to deliver very high data rate services. Realizing this potential will require that a myriad of challenges be addressed ranging from propagation and channel modeling to antenna and RF design to wireless systems architecture.

Dr. Yves Lostanlen is currently President & CEO of SIRADEL North America and is based in Toronto, Canada. This high-tech company provides 3D geographical data, leading 3D propagation software and expertise to the Telecommunication Industry (Wireless, Smart city). Yves Lostanlen is also Adjunct Research Professor at University of Toronto (Faculty of Applied Science and Engineering). His recent scientific interests are on EMF exposure assessment, cost-efficient wireless deployment using big data, and new simulation techniques of physical phenomena. Prof Yves Lostanlen has a personal interest in technologies (ICT4D) supporting global economic growth, sustainability and social development. Born and raised in France, Yves holds a Doctorate of Science (Habilitation) in Physics, a PhD and an MSc in Electrical & Computer Engineering, and an Executive MBA from Massachusetts Institute of Technology, MIT Sloan.

David Wessel is Leader, 5G RF Technologies at Huawei Technologies, Canada Research Center. He has been with Huawei in various roles in Wireless and Technology R&D since 2009 where his research has focused on advanced RF technology

development in wireless as well as microwave and millimeter wave components, circuits and systems. He was employed from 1991 to 2009 with Nortel Networks in capacities ranging from RF amplifier systems to advanced radio architectures for wireless systems. Previous to Nortel he worked in advanced radar amplifier technology research.

Rapeepat Ratasuk received the Ph.D. degree in electrical engineering from Northwestern University, Evanston, IL, USA, in 2000. He is currently a Principal Research Specialist with the North American Radio Systems Research Group, Technology and Innovation Office, Nokia Networks, Arlington Heights, IL. He has extensive experience in 3G/4G cellular system design and analysis, including algorithm development, performance analysis and validation, physical-layer modeling, and simulations. He is a coauthor of the book titled Essentials of LTE and LTE-A. He has more than 35 issued patents and more than 40 journal and conference papers. His current research interests are in the areas of wireless and machine-to-machine communications.

Monday 15 September 2014, 16:00–17:30 (Seymour)

J3: The Challenge of Defining 5G

Chair: **Peiyong Zhu** *Huawei Technologies, Canada*
 Adam Tenenbaum *TELUS, Canada*

Panelists: **Dean Brenner** *Senior Vice President, Government Affairs, Qualcomm, USA*
 David Keegstra *Chief Technology Officer, Ericsson Canada*
 Anthony Soon *Chief Scientist for Wireless Research & Standards, Huawei Tech., USA*
 Juan Ranuarez *Director, Technology Strategy – Device Evolution, TELUS, Canada*

This session will consider the myriad of factors that challenge the industry as we seek to define 5G. The four presenters approach the issue from legal, product development, standards and carrier perspectives.

Dean Brenner is Senior Vice President, Government Affairs for Qualcomm Incorporated. He directs Qualcomm's global spectrum acquisitions and strategy and is responsible for the Company's global technology policy. He represents Qualcomm before the Federal Communications Commission and other agencies of the United States and Canadian governments responsible for spectrum and telecommunications policy and interacts with spectrum regulators around the world. He also leads Qualcomm's policy initiatives relating to mobile healthcare. Mr. Brenner led Qualcomm's bidding team in spectrum auctions in India (the 2.3 GHz band), the United States (the 700 MHz band), and the United Kingdom (the L Band). In addition, he was responsible for obtaining the regulatory approvals for Qualcomm's sale of Lower 700 MHz spectrum to AT&T in 2011. He has spoken at conferences on spectrum policy in the United

States, Canada, South Korea, Belgium, Great Britain, and elsewhere around the world. He joined Qualcomm in November 2003. Mr. Brenner received his A.B. degree, magna cum laude with distinction in public policy studies, from Duke University in 1982. He received his J.D., cum laude, from Georgetown University in 1985. He is admitted to the Bars of the District of Columbia, Maryland, and the U.S. Supreme Court, the U.S. Courts of Appeal for the D.C., Third, and Eleventh Circuits, and the U.S. District Court for the District of Columbia.

David Keegstra started his career at Nortel and was involved the introduction of 2G wireless technologies – TDMA, GSM, CDMA. He led a team to design and deploy 2G networks across Canada. In the 2000s Dave was the Wireless Access Technology development head at TELUS in Scarborough introducing wireless data from 2.5G 1XRTT through HSPA+. This involved defining

the wireless access strategy and transport evolution to IP using existing wireline broadband IP core networks. At Ericsson, Dave is involved in introducing M2M architectures and middleware, multiscreen TV, new agile OSS/BSS solutions and the evolving network architectures in virtualization and software defined IP networks.

Anthony C. K. Soong received the B.Sc. degree in animal physiology and physics from the University of Calgary, and the B.Sc. degree in electrical engineering, the M.Sc. degree in biomedical physics and the Ph.D. degree in electrical and computer engineering from the University of Alberta. He is currently the Chief Scientist for Wireless Research and Standards at Huawei Technologies Co. Ltd, in the US. His research group is actively engaged in the research, development and standardization of the next generation cellular system. He served as the chair for 3GPP2 TSG-C NTAH (the next generation radio access network technology development group) from 2007-2009 and vice chair for 3GPP2 TSG-C WG3 (the physical layer development group for CDMA 2000) from 2006-2011. Prior to joining Huawei, he was with the systems group for Ericsson Inc and Qualcomm Inc. His research interests are in statistical signal processing, robust statistics, wireless communications, spread

spectrum techniques, multicarrier signaling, multiple antenna techniques and physiological signal processing. He was elected as an IEEE Fellow in 2014. He was the co-recipient, with his co-authors, of the 2013 IEEE Signal Processing Society Best Paper Award. He received the 2005 award of merit for his contribution to 3GPP2 and cdma2000 development. He has acted as guest editor for the IEEE Communications Magazine and IEEE Journal on Selected Areas in Communications.

Juan Ranuarez is currently Director of Device Evolution at TELUS, a leading national telecommunications company in Canada, where he leads a team responsible for planning, implementing, supporting and retiring technologies on TELUS' wireless devices, from radio access and voice/data services, to mobile application platforms, to emerging services such as Machine to Machine (M2M). For the last 15 years Juan has held positions in different areas of the mobile communications industry, including mobile network engineering, telecom policy development and enforcement and radio-frequency integrated circuit design. Juan holds a BSc in Electronics Engineering from Simon Bolivar University (Venezuela) and a MAsC in Electrical Engineering from McMaster University (Hamilton, Ontario, Canada).

Tuesday 16 September 2014, 10:30–12:00 (Seymour)

J4: Autonomous Vehicles

Chair: **Paul Godsmark** *CTO, The Canadian Automated Vehicles Centre of Excellence, Canada*
Panelists: **Robert G. Shirra** *Managing Director, ITS Canada*
Mohammad Ali *Senior Researcher, Volvo, Sweden*
Andrew Poliak *Global Director Business Development, QNX, Canada*

Imagine a world where, on your drive into work, you can catch up on your favorite TV show, check in with friends and family, and get an extra hour of work completed, before you even step into the office. “Drivers” may have that luxury as driving becomes more of a passive activity – and opens up the car interior to even more entertainment options – thanks to autonomous vehicles.

Autonomous cars of the future will feature advanced safety elements in addition to the latest infotainment system capabilities. When it comes to supporting both safety and infotainment features, how will automotive technology evolve to meet both aspects of the new car? What technology providers are best suited to satisfy the requirements of OEMs and the demands of consumers?

Paul Godsmark is the Chief Technology Officer, and Co-Founder, of the Canadian Automated Vehicles Centre of Excellence (CAVCOE). He is a Chartered Engineer (UK) and has 25 years of experience as a road designer, project manager, road safety and ITS specialist in nine countries on four different continents. Since 2011 Paul has become a self-taught specialist in emerging technologies in transportation and particularly automated vehicles and their socio-economic impacts. He has written numerous papers, articles and blogs on automated vehicles and has been interviewed for both Canadian radio and various syndicated articles. He founded the ITS Canada Autonomous Vehicle Task Force in 2012 and is now a member.

When he retires he hopes to buy a ‘pimped-out’ fully self-driving RV and tour North America along with a large community of like-minded itinerant snowbirds.

Robert G. Shirra is Managing Director for ITS Canada, effective June 1, 2014. His areas of focus over his 30+ year IT career include strategic and business planning, enterprise architecture development, program and project management, strategic sourcing and supplier management, large scale technology and systems deployments, change management and training, and technology consulting. He previously served 21 years as President of RGS Consulting International Inc. serving

clients in Canada and the U.S. During this period, he was focused on serving clients in the public transport, insurance, telecommunications, retail/distribution industries and government. Rob has served the public transport industry through his involvement in the ISO Technical Committee 204, Intelligent Transport Systems (ITS). Rob has gained prominence throughout the IT and ITS professions and has been a frequent speaker at events such as the ITS World Congress and the ITS Canada/ITS America Annual Conferences. In addition to holding Bachelor of Science degree (Computer Science and Economics, 1972), Rob is a Certified Management Consultant (www.cmc-canada.ca). In 2008, Rob was awarded the prestigious Fellow of the Institute of Certified Management Consultants of BC (FCMC), in recognition of his long service to the profession of management consulting. Mr. Shirra is also a Director of the Westminster Savings Credit Union in New Westminster, BC.

Mohammad Ali received the M.S. and Ph.D. degrees in 2005 and 2012, respectively, both from Chalmers University of Technology in Sweden. Since 2005 he is with the Volvo Car Corporation, Sweden. He is currently a senior researcher and function developer at the Active Safety and Chassis department. His current research interests involve active safety, vehicle dynamics control and driving automation technologies.

As global director of business development at QNX Software Systems, **Andrew Poliak** is responsible for building, developing, and maintaining relationships in all of the company's key markets, including automotive, medical, industrial, and networking. Automakers, tier one automotive suppliers, and automotive industry analysts all recognize Mr. Poliak as an automotive thought leader. He is a founding member of multiple consortia, speaks frequently at automotive telematics events, and advises analysts on trends and issues in the automotive market.

He holds patents for a framework that consolidates access to multimedia devices, and for social in-vehicle navigation via images encoded with location data. He also helped define and launch the QNX CAR Platform for Infotainment, which significantly reduces the upfront engineering needed to develop connected in-vehicle systems. Mr. Poliak holds a Bachelor of Arts in Business with an emphasis in Information Systems from the University of Washington.

Tuesday 16 September 2014, 13:30–15:00 (Seymour)

J5: Connected Vehicles

Chair: **David Atnikov** *Novax Industries, Canada*
Panelists: **Mark Francis** *Senior Manager of Provincial Vehicle Registration, ICBC, Canada*
Geoff Cross *Senior Manager, Policy and Analytics, Translink, Canada*
Garland Chow *Associate Professor, Sauder School of Business, UBC*
Donald Wong *Chief Executive Officer, Moovee Innovations*

Mark Francis is the Senior Manager of Provincial Vehicle Registration and Licensing for British Columbia, at ICBC. Mark has served in this position since March 2003, and has been with ICBC for the past 27 years.

Mark represents the province of BC for Vehicle Programs with both the Canadian Council of Motor Transport Administrators (CCMTA) and the American Association of Motor Vehicle Administrators (AAMVA) and has done so since 2003. He is also a past Chair of the CCMTA Standing Committee on Drivers and Vehicles and the current Chair of AAMVA's Unconventional Vehicles Working Group. Mark also Co-Chairs the CCMTA Automated Vehicle Working Group and is the president of the Insurance Institute of British Columbia. Mark has been leading engagement on the subject of Automated Vehicles for ICBC, and promoting long term planning within the organization on this subject due to the many anticipated impacts and implications on the organization, including resources and the overall business model.

Geoff Cross's team at TransLink leads the development of the objectives and policies for managing Metro Vancouver's regional transportation system for both the near and longer term. Their diverse mandate includes analyzing how the system is performing and responding with policies, pricing and funding strategies for areas such as transit service, rapid transit and major infrastructure, bicycle and pedestrian planning, network demand and parking management, and integrated land use and transit oriented communities planning. Previously, Geoff managed the development of TransLink's 10- Year strategic plan that most recently included the approval and funding for the new Evergreen rapid transit line and other expansion initiatives. That plan established a new performance-based prioritization tool that has guided how the organization's investment decisions are made.

Before joining TransLink in 2008, Geoff worked for public, private and non-profit sectors of the sustainable transportation planning field in Wisconsin, Arizona and Oregon.

Garland Chow is Associate Professor in the Operations and Logistics Division and Director of the Bureau of Intelligent Transportation Systems and Freight Security both in the Sauder School of Business at the University of British Columbia. Dr. Chow teaches and writes in the fields of supply chain, business logistics and freight transport management. He is a frequent speaker before professional associations and executive programs and is a member of several editorial boards and an active participant in Supply Chain and Logistics Canada, which awarded him their 2003 National Mentor Award and 2008 National Service Award. He also serves on the accreditation review panel of the Canadian Supply Chain Sector Council. His current research interests include: offshore and nearshore sourcing strategy and evaluation, total logistics costs decision making, and the modelling of security and efficiency of cross-border and global freight movement. He earned his BS and MBA degrees from the University of Maryland and doctorate from Indiana University.

Donald Wong is the Chief Executive Officer at MooVee Innovations, a Vancouver-based start up that is developing a compact electric car. The vehicle aims to reduce emissions and use connected vehicle technology to decrease the stress associated with parking in the city. Creating a ride-share structure around these automobiles will be a further improvement, reducing residential parking needs while providing a comfortable form of transportation for individuals and small families. He received a master's degree in Wireless and RF from Carleton University in 1986. His areas of expertise include antenna arrays and nonlinear microwave circuits.

Tuesday 16 September 2014, 15:30–17:00 (Seymour)

J6: Automated and Connected Vehicles

Moderator: **John Niles** *President, Global Telematics, USA*
Panelists: **Steve Marshall** *ED, Center for Advanced Transportation and Energy Solutions, USA*
Charlie Howard *Director, Integrated Planning, Puget Sound Regional Council, USA*
Mohammad Ali *Senior Researcher, Volvo, Sweden*
Geoff Cross *Senior Manager, Policy and Analytics, Translink, Canada*

This session will consider the myriad of factors that challenge the industry as we seek to define 5G. The four presenters/panelists approach the issue from legal, product development, standards and carrier perspectives.

Steve Marshall is Executive Director of the non-profit Center for Advanced Transportation and Energy Solutions. He has more than 30 years of experience working on energy and transportation issues, including serving as chief outside legal counsel to Puget Sound Power & Light at the law firm of Perkins Coie and at Snohomish PUD in charge of power, transmission and conservation. Steve has served on the boards of numerous civic groups including the Municipal League of Seattle/King County where he is a past chairman and member of its board and transportation committee. He was chair of the Administrative Law Section of the Washington State Bar Association and has been named to “Best Lawyers in America.” He has served as an advisor to the Washington State Economic Development Commission and was on the Regional Transit Task Force working on regional transportation issues. He is a frequent speaker and writer on energy and transportation issues. Steve has organized and moderated a series of conferences on transportation and energy that have become known as the “Beyond Oil” conferences,” including one celebrating the 50th anniversary of the Seattle World’s Fair. Steve wrote the chapter on utility issues in the book “Plug-in Electric Cars: What Role for Washington,” edited by David Sandalow, former Assistant

Secretary for Policy and International Affairs at the U.S. Department of Energy. He is one of the authors of a new book, “Road Vehicle Automation,” published in June. He graduated from the University of Washington, magna cum laude, Phi Beta Kappa; and from Harvard Law School with honors.

Charlie Howard is the Director of Integrated Planning for the Puget Sound Regional Council (PSRC), a position that brings together the work the agency does in Growth Management, Economic Development, and Transportation Planning and the supporting data and technical resources. He has been with the PSRC since 2005. Prior to joining PSRC, Charlie worked with the Washington State Department of Transportation for 18 years, most recently as the Director of Strategic Planning and Programming. Charlie has been involved in state and regional transportation issues for the past 30 years, including an active role in developing and implementing the state of Washington’s growth management act. Charlie is a graduate of Ohio State University, and has a Master’s Degree in City and Regional Planning from Harvard University.

Mohammad Ali’s biography appears on page 17.

Geoff Cross’s biography appears on page 18.

Wednesday 16 September 2014, 8:30–9:15 (Seymour)

IEEE Transportation Electrification Initiative

Lee Stogner, *President, Vincula Group & Chair, IEEE TEI*

Lee Stogner is the President of the Vincula Group, a consultancy business in energy management, transportation solutions, systems integration and project management. Lee has over 30 years of design, consulting, project management and business development experience across a range of industries. Lee has driven growth at companies that include Digital Equipment, Fluor Corporation and Rockwell International. Customers around the world have benefited from Lee’s expertise and leadership.

Throughout his working career, Lee has been active in both local and international professional activities. Lee is the Chair of the Carolinas’ Engineering Cluster and a past Director of the IEEE Board of Directors. Today, Lee is active in promoting the development of advanced transportation through his participation in the IEEE Smart Grid Initiative, the IEEE Energy Policy Committee, the IEEE Internet of Things Initiative and as Chair of the IEEE Transportation Electrification Initiative.

Wednesday 16 September 2014, 9:15–10:00 (Seymour)

Can Versus Should: Creating meaningful and user-centered automotive experiences

Teaque Lenahan, *Executive Director of Innovation Strategy, frog design, USA*

Teaque Lenahan is passionate about helping clients create real growth, build conviction, and harness change via research, strategy, design, and technology. Over twenty years, he has helped diverse B2C and B2B clients innovate their strategies, products, services, brands, and organizations. As the Executive Director of Innovation Strategy, he is responsible for driving frog’s clients’ growth, and is the co-lead of frogLabs. He is a frequent lecturer on design + innovation at the Kellogg School of Management at Northwestern, teaches the “Customer Relevance” course at CEDIM in Mexico, and has spoken at industry

conferences and graduate schools of business and design on diverse topics such as healthcare, consumer products, sustainability, and financial services. Prior to frog, he was at innovation consultancy gravitytank, crafted brand strategies at Prophet Brand Strategy, and designed processes and organizations while at Andersen Consulting (Accenture). He holds a BA cum laude from Middlebury College and an MBA from the Kellogg School of Management at Northwestern University.

Wednesday 17 September 2014, 10:30–12:00 (Seymour)

J8: Electric Vehicle Charging Initiatives in British Columbia

Moderators: **Jeff Turner** *Powertech Labs*

Ahmed Hussein *UNBC*

Panelists: **Teaque Lenahan** *Executive Director of Innovation Strategy, frog design, USA*

Alec Tsang *Senior Technology Strategist, BC Hydro*

Ian Neville *Project Manager, City of Vancouver*

Moutie Wali *Director, Technology Strategy and Operations – Mobile Broadband, TELUS*

Recent initiatives to establish electric vehicle charging infrastructure in BC have involved a diversity of players. After an introduction to human factors issues in the design of electric vehicle charging stations, the session

considers the role of BC Hydro, the City of Vancouver and TELUS in both city-wide and province-wide initiatives.

Teaque Lenahan's bio appears on page 19.

Alec Tsang is a Senior Technology Strategist with the Technology Innovation Group at BC Hydro, responsible for shaping BC Hydro's role in the electrification of transportation in the Province of British Columbia. Alec has led pan-Canadian initiatives for reducing barriers to electric vehicle adoption such as the development of EV infrastructure installation guidelines and the deployment of a critical EV infrastructure network in BC. He also works on utility/EV interconnection issues such as grid impacts, customer EV needs and regulatory and policy implications. During Alec's 10 years at BC Hydro, he also led other emerging technology projects in the area of hydrogen and fuel cells. Prior to BC Hydro, Alec practiced environmental engineering and consulting in Hong Kong, implementing water treatment for the textile industry and conducting environmental impacts and mitigation for the construction industry.

Ian Neville is the project manager for the City of Vancouver's Charge and Go electric vehicle infrastructure trial, which recently helped Vancouver win the Federation of Canadian Municipalities' 2014 Sustainable Communities Award for Transportation. Ian co-chairs the Municipal Working Group of

Wednesday 17 September 2014, 13:30–17:00 (Seymour)
J9 & J10: Workshop on Automotive EMC

High-Power and High-Efficiency Wireless Power Charging System for Electric Automotive Vehicles and Electromagnetic Compatibility Design Challenges

Joungho Kim, Korea Advanced Institute of Science and Technology

Wireless power transfer technologies can provide us a freedom from hardwired connectivity when using electrical powers for mobile platforms, home appliances, and automotive vehicles. Furthermore, we can reduce the cost of system power wirings, and will be able to reduce capacity and weight of batteries. Among the various wireless power transfer technologies, resonant magnetic field can offer not only the highest power transfer efficiency, but also the higher wireless transmission power in near field distance, especially for automotive wireless power charging applications. In this presentation, the basic principles of the high-power and high-efficiency wireless power charging system using the magnetic field resonance will be introduced. In addition, necessary models, simulation methods, and design methodologies will be described. Also, the key design approaches including the resonant magnetic coil design, magnetic field forming, and matching techniques will be described. Finally electromagnetic compatibility issues and associated technical challenges caused by the strong high-frequency resonant magnetic fields will be presented including active and passive shielding methods.

Dr. Joungho Kim received B.S. and M.S. degrees in electrical engineering from Seoul National University, Seoul, Korea, in 1984 and 1986, respectively, and Ph.D. degree in electrical engineering from the University of Michigan, Ann Arbor, in 1993. In 1996, he moved to KAIST (Korea Advanced Institute of

Electric Mobility Canada, and is also a contributor to the Emotive BC electric vehicle outreach campaign on behalf of the City of Vancouver. Ian has been working on climate change and sustainability projects for over twelve years. Prior to his entry into municipal government, Ian toured many local utilities, working as an environmental manager for Terasen Gas, BC Transmission Corporation, and BC Hydro.

Moutie Wali is the director of Technology Strategy at TELUS. Moutie leads the Mobile Broad Band Planning & Engineering team in the Technology Strategy organization. In his role Moutie is responsible of the design, engineering and planning of all wireless network elements including Outdoor and Indoor cell sites. Projects like introducing Outdoor Small Cells in Canada, expanding LTE network, and building indoor coverage in complex large venues were all born in the Broad Band Engineering team. Moutie has been in the telecommunication industry for more than 12 years, where he held several positions in Product Development, RF engineering Design, and Technical Sales at Alcatel-Lucent before joining TELUS in 2011. Moutie has a Master of Engineering Degree from Versailles University, France.

Science and Technology). He is currently professor in the electrical engineering department of KAIST. He is also the director of 3DIC-RC (3DIC Research Center) supported by SK Hynix Inc. and SAE-RC (Smart Automotive Electronics Research Center) supported by KET Inc. Since joining KAIST, his research centers on EMC modeling, design, and measurement methodologies of 3D IC, TSV, Interposer, System-in-Package, and multi-layer PCB. Recently, he has developed design methodologies for high-power and high-efficiency wireless power charging systems for automotive vehicles using magnetic field resonance. Dr. Joungho Kim was the conference chair of IEEE WPTC (Wireless Power Transfer Conference) 2014, held in Jeju Island, Korea. He was also the symposium chair of IEEE EDAPS Symposium 2008, and was the TPC chair of APEMC 2011. He is also an associate editor of the IEEE Transactions of Electromagnetic Compatibility. He served as a guest editor of the special issue in the IEEE Transactions of Electromagnetic Compatibility for PCB level signal integrity, power integrity, and EMI/EMC in 2010, and also as a guest editor of the special issue in the IEEE Transactions of Advanced Packaging for TSV (Through-Silicon-Via) in 2011.

EMC Design for Automotive Electronics

Todd H. Hubing, Clemson Vehicular Electronics Laboratory

In many ways, good EMC design practices for automotive electronic systems are similar to good EMC design practices in other industries such as avionics, telecommunications and consumer electronics. However automotive systems present a unique set of EMC challenges due to their harsh electromagnetic environments, long service life, high volumes and tremendous pressure to reduce costs. In addition, a rapidly increasing number of automotive systems perform safety-critical tasks. This presentation reviews EMC design

practices that are particularly important in the automotive industry. Issues of related to the design and modeling of infotainment systems, engine and transmission control systems, crash avoidance systems and high-voltage power inverters are discussed.

Dr. Todd H. Hubing is the Michelin Professor of Vehicle Electronic Systems Integration at Clemson University and Director of the Clemson Vehicular Electronics Laboratory (CVEL). His research focuses on the design of electronic components and systems that work safely and reliably in automotive environments. He holds a BSEE degree from MIT, an MSEE degree from Purdue University and a Ph.D. from North Carolina State University. He was an engineer with IBM for seven years and a faculty member at the University of Missouri-Rolla for 17 years before joining Clemson University in 2006. At Clemson, he teaches classes in vehicle electronics, electromagnetic compatibility and digital signal integrity. He is a Fellow of the Institute of Electrical and Electronics Engineers (IEEE), a Fellow of the Applied Computational Electromagnetics Society, and a Past-President of the IEEE Electromagnetic Compatibility Society.

Gallium-Nitride Power Electronics for Electric Vehicle Applications

Karim Boutros, *HRL Laboratories*

Rapid adoption of electric vehicles will benefit from new, game changing technologies, which enable smaller, lighter, and more efficient electric power management systems. Existing power electronics using silicon are approaching their maximum theoretical performance, and use bulky components, which limit the size and weight of the circuit. Gallium-Nitride (GaN) based power electronics offer 10-fold improvement of the cost-performance of present day systems. In this talk we will review HRL's normally-off GaN-on-Si switch technology and integrated low-inductance packaging, which has been demonstrated in the lab at kW powers, with high efficiency. We will benchmark our technology against present and next generation power switches and use the example of a battery charger to demonstrate the value proposition of GaN in electric vehicles.

Dr. Karim S. Boutros is the manager of the Energy Efficient Electronics Department at HRL Laboratories. He joined HRL in

2008 to lead the development of Gallium Nitride Power Electronics. Prior to HRL he was a Senior Scientist at Teledyne Scientific. He has more than 17 years of experience in microelectronic devices, and has held multiple technical roles spanning material growth, device engineering and processing, as well technical program management. He is one of the pioneering researchers in the field of Wide-bandgap Electronics as applied to power electronics. Dr. Boutros received his Ph.D. in Electrical Engineering from North Carolina State University in 1996. He is a Senior Member of the IEEE and has coauthored over 75 technical publications and 10 patents.

The Increasing Need for Wireless Testing in the Automotive Industry

Garth D'Abreu, *ETS-Lindgren*

The long established automotive industry has been experiencing a transition from the traditional immunity and emission measurements required for certification, to the increasing implementation of new tests traditionally associated with measuring the performance of wireless devices and antennas. This trend is ongoing and so far has seen the introduction of standardized tests intended to verify that vehicle operation is not affected by the on board communication. We will look at some of the existing test facility types in common use and some of the options for building dual purpose or combination chambers to satisfy both test types.

Garth D'Abreu is the Director of RF Engineering at ETS-Lindgren based at the corporate office in Cedar Park, Texas. He has primary responsibility for the design and development functions within the Systems Engineering group. The Systems group provides technical support for ETS-Lindgren worldwide and is directly responsible for anechoic chamber, E-Field generator, TEM device and instrumentation system design and development. Mr. D'Abreu is the lead engineer for reverberation chamber design and test and is responsible for the development of GTEM cells, EMP protection applications and wireless device test systems. He also provides technical support to the Filter department. He holds a BSc degree in Electronics & Communications Engineering, from North London University, UK. He is a member of the IEEE EMC Society, and active participant in standards development with has over 20 years of experience in the RF industry.

Tutorials

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

Sunday 14 September 2014, 8:30–12:00 Cypress 1

T1: Hyper-Dense Heterogeneous Wireless Networks

Abolfazl Mehbodniya, Fumiyuki Adachi (Tohoku University), and Ismail Guvenc (Florida Int. Univ.)

The information and communication technology (ICT) data traffic is expected to increase 1,000 fold by 2020. This increasing demand is quickly draining the scarce radio resources and will eventually affect our nations' economy. This strongly motivates the need for intensive research on the next generation of wireless networks. Beyond conventional cellular data, machine-to-machine (M2M) and device to device (D2D) communication will

be responsible for a big portion of the wireless traffic in the next few years. For coping with such traffic growth, it is well known that the major technique for meeting a much needed 1000x capacity improvement will be a byproduct of massive network densification. The idea is to introduce heterogeneous networks (HetNets) having new, additional nodes, such as small cell base stations, deployed within local-area range and making the network closer to the end-users. The integration of macro/micro/pico/small cell base stations (SBSs) with disparate cell sizes and capabilities, has already been approved as a working item in LTE-advanced and 5G. Such hyper-dense and heterogeneous networks (HDHNS) can significantly improve

spatial frequency reuse and coverage, thus meeting the wireless capacity crunch. For example, it is envisioned that a viral and hyper-dense deployment of low-cost small cells in the near future, with 200-300 small cells per typical macro cell coverage, approaching one-to-one ratio with the number of UEs. The main goal of this tutorial is to introduce different aspects of designing HDNs with advanced capabilities while focusing on spectral-efficiency (SE) and energy-efficiency (EE).

Abolfazl Mehdodniya received his PhD from INRS-EMT University of Quebec, Montreal, Canada in 2010. He has 10+ years of experience in electrical engineering, wireless communications, and project management. He has over 40 published conference and journal papers in the areas of radio resource management, sparse channel estimation, interference mitigation, short-range communications, 4G/5G design, OFDM, heterogeneous networks, artificial neural networks (ANNs) and fuzzy logic techniques with applications to algorithm and protocol design in wireless communications. He is the recipient of JSPS fellowship for foreign researchers, JSPS young faculty startup grant and KDDI foundation grant.

Fumiyuki Adachi is an IEEE Fellow and an IEICE Fellow. He is a pioneer in wireless communications since 1973 and has largely contributed to the design of wireless networks from 1 generation (1G) to 4G. He is listed on ISIHighlyCited.com and is an IEEE Vehicular Technology Society Distinguished Lecturer since 2012. He is a vice president of IEICE Japan since 2013. He was a recipient of the IEEE Vehicular Technology Society Avant Garde Award 2000, IEICE Achievement Award 2002, Thomson Scientific Research Front Award 2004, Ericsson Telecommunications Award 2008.

Ismail Guvenc received his Ph.D. degree in electrical engineering from University of South Florida in 2006, with an outstanding dissertation award. He was with Mitsubishi Electric Research Labs during 2005, and with DOCOMO Innovations Inc. between 2006-2012, working as a research engineer. Since August 2012, he has been an assistant professor with Florida International University. His recent research interests include heterogeneous wireless networks and future radio access beyond 4G wireless systems. He has published more than 80 conference and journal papers, and several standardization contributions. He co-authored/co-edited three books for Cambridge University Press, is an editor for IEEE Communications Letters and IEEE Wireless Communications Letters, and was a guest editor for four special issue journals/magazines on heterogeneous networks.

Sunday 14 September 2014, 13:30–17:00 Cypress 1

T2: Energy Efficiency in Wireless Networks

F. Granelli (U. Trento), M. Di Renzo (CNRS), G. Kormentzas (U. Aegean), C. Verikoukis (CTTC)

With the increasing growth of wireless access to the Internet and its services, wireless networks represent a key communication infrastructure for ubiquitous connectivity. The need to support exponential growth in data traffic as well as availability of several mobile devices (smartphones, tablets, etc.) is leading to a sharp increase in the number of base station devices and in their complexity, leading to a consequent increase in power usage and consumption. Indeed, high power consumption can represent a limiting factor for the scalability of next generation wireless networks.

The tutorial will first present an overview of power consumption in wireless networks, aimed at identifying the major sources of power consumption and to define proper benchmarks for performance evaluation. Based on such analysis, different architectural and technological solutions will be proposed in

order to reduce or optimize energy consumption in wireless networks. Based on the reference heterogeneous scenario of coexisting 3G LTE macro/pico/femto base stations, relay terminals, WiFi WLANs, etc. the tutorial will survey the relevant solutions at the PHY, MAC and network level, as well as advanced paradigms related to cooperation, network coding and cognition.

All major solutions will be analyzed and compared by offering the unique vision provided by the EU-funded GREENET project, with detailed simulations as well as real testbed experiments.

Fabrizio Granelli is IEEE ComSoc Distinguished Lecturer for 2012-15, and Associate Professor at the University of Trento (Italy). From 2008, he is deputy head of the academic council in Information Engineering. He is author or co-author of more than 130 papers on networking, with focus on wireless communications and networks. He was General Chair of the 11th and 15th IEEE Workshop on Computer-Aided Modeling, Analysis, and Design of Communication Links and Networks (CAMAD'06 and IEEE CAMAD'10). He is TPC Co-Chair of IEEE GLOBECOM Symposium on "Communications QoS, Reliability and Performance Modeling" in the years 2007, 2008, 2009 and 2012. He was officer (Secretary 2005-2006, Vice-Chair 2007-2008, Chair 2009-2010) of the IEEE ComSoc Technical Committee on Communication Systems Integration and Modeling (CSIM), and Associate Editor of IEEE Communications Letters (2007-2011).

Marco Di Renzo (SM-IEEE) is a Tenured Academic Researcher with the French National Center for Scientific Research (CNRS) and a faculty member of the Laboratory of Signals and Systems (SUPELEC, U. Paris-Sud XI). He is a recipient of several awards, which include the 2013 IEEE-COMSOC Best Young Researcher Award for Europe, Middle East and Africa. He is an Editor of IEEE-COMML and IEEE-TCOM.

Georgios Kormentzas is currently Assistant Professor in the University of the Aegean, Dep. of Information and Communication Systems Engineering. He received the Ph.D. in Computer Engineering from the National Technical University of Athens (NTUA), Greece in 2000. He has been actively working for many years on the area of network management and quality of service of computer and communication systems where he has introduced the concept of abstract information model, an ancestor of next generation networking middleware, which constitutes his main current research interest along with event-based distributed systems.

Christos Verikoukis got his Ph.D. from the Technical University of Catalonia in 2000. He is currently a Senior Researcher at CTTC and an adjunct professor at UB. He has published 50 journal papers and over 120 conference papers. Dr. Verikoukis has participated more than 20 competitive projects and has served as the Principal investigator in 3 national (Greece and Spain) and as technical manager in 7 Marie-Curie and 2 Celtic projects.

Sunday 14 September 2014, 8:30–12:00 Cypress 2

T3: Architectures, Models and Networks for Electric Vehicles in the Smart Grid

Hussein T. Mouftah & Melike Erol-Kantarci (University of Ottawa)

Electric vehicles pose a number of challenges to the smart grid due to their heavy charging load while vehicle batteries emerge as promising Distributed Energy Resources (DERs) that can be used for the benefit of the smart grid. Challenges and opportunities emerging from electric vehicle integration to the smart grid

brought forward numerous recent works that address architectures, models and networks to enable communications and control for electric vehicles. Electric vehicle and smart grid interaction is a newly flourishing research field receiving significant attention from communications, power and automotive societies. This tutorial aims to equip the audience with a comprehensive background on the subject matter, present state-of-the-art architectures, models and networks in the domain and provide a thorough list of open issues which is invaluable for the researchers who are planning to steer their research direction to this area as well as expert researchers who are already actively working on this topic and seeking new directions.

Hussein Mouftah is with the School of Electrical Engineering and Computer Science, University of Ottawa (since 2002), as a Senior Canada Research Chair and Distinguished University Professor. He has been with the ECE Department at Queen's University (1979-2002). He has three years of industrial experience mainly at BNR of Ottawa (or Nortel Networks, 1977-79). He is the author or coauthor of eight books, 59 book chapters and more than 1200 technical papers and 12 patents in this area. Dr. Mouftah is a Fellow of the IEEE, the Canadian Academy of Engineering, the Engineering Institute of Canada and the Royal Society of Canada RSC: The Academy of Science.

Melike Erol-Kantarci is 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 of 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. She is an occasional reviewer of transactions and journals, and a TPC member for various conferences. Her main research interests are wireless sensor networks, smart grid, cyber-physical systems, electrification of transportation, underwater sensor networks, mobility modeling, localization and internet traffic analysis. She is an editor of International Journal of Distributed Sensor Networks published by Hindawi. She is an IEEE member and the vice chair for Women in Engineering (WIE) at the IEEE Ottawa Section.

Sunday 14 September 2014, 13:30–17:00 Cypress 2

T4: Spatial Modulation for MIMO Wireless Systems

Marco Di Renzo (CNRS–SUPELEC), Harald Haas (Univ. of Edinburgh), Ali Ghayeb (Texas A&M Univ. Qatar)

The key challenge of future mobile communications research is to strike an attractive compromise between wireless network's area spectral-efficiency and energy-efficiency. This necessitates new approaches to wireless system design, embracing the rich body of existing knowledge especially on Multiple-Input-Multiple-Output (MIMO) technologies. In the proposed tutorial, we intend to describe a new and emerging concept to wireless system design, which is conceived for single-RF large-scale MIMO communications and it is best-known as Spatial Modulation (SM). The concept of SM has established itself as a beneficial transmission paradigm, subsuming numerous members of the MIMO system-family. The research of SM has reached sufficient maturity to motivate its comparison to state-of-the-art MIMO communications, as well as to inspire its application to

other emerging wireless systems such as relay-aided, cooperative, small-cell, optical wireless and power-efficient communications. Furthermore, it has received sufficient research attention to be implemented in testbeds, and it holds the promise of stimulating further vigorous inter-disciplinary research in the years to come.

The proposed tutorial is intended to offer a comprehensive state-of-the-art survey on SM-MIMO research, to provide a critical appraisal of its potential advantages, and to promote the discussion of its beneficial application areas and their research challenges leading to the analysis of the technological issues associated with the implementation of SM-MIMO. The tutorial is concluded with the description of the world's first experimental activities in this vibrant research field.

Marco Di Renzo (SM'14) received the Ph.D. degree from the University of L'Aquila, Italy, in 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, an academic research laboratory of the CNRS, SUPELEC and the University of Paris-Sud XI, France. His main research interests are in the area of wireless communications theory. He is a recipient of a several awards, which include the IEEE VTC2103-Fall Best Student Paper Award for the paper entitled "Performance of Spatial Modulation using Measured Real-World Channels"; the 2013 Top Reviewer Award from the IEEE Transactions on Vehicular Technology; and the 2013 IEEE/COMSOC Best Young Researcher Award for the EMEA Region. He currently serves as an Editor of the IEEE Communications Letters and of the IEEE Transactions on Communications.

Harald Haas (M'03) holds the Chair of Mobile Communications at the University of Edinburgh. His main research interests are in the area of wireless system design and analysis. He is Associate Editor of IEEE Transactions on Communications. He recently has been awarded the EPSRC Established Career Fellowship. He also received the IEEE VTC2103-Fall Best Student Paper for the paper entitled "Performance of Spatial Modulation using Measured Real-World Channels".

Ali Ghayeb (SM'06) received the Ph.D. degree from the University of Arizona in 2000. He is currently a Professor with the Department of Electrical and Computer Engineering, Concordia University, Canada. He is a co-recipient of the 2010 IEEE Globecom Best Paper Award. He holds a Concordia University Research Chair in Wireless Communications. His research interests include wireless and mobile communications, MIMO systems, wireless cooperative networks and cognitive radio systems. He serves as an Editor of the IEEE Transactions on Communications.

Sunday 14 September 2014, 8:30–12:00 Oak 1

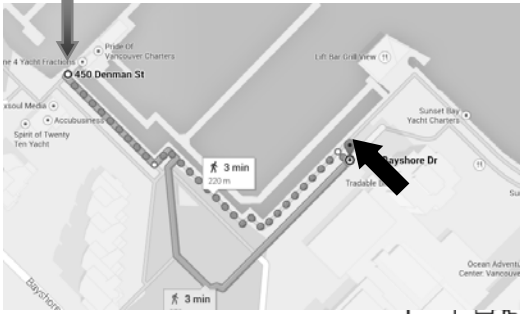
T5: The Future of Multiple-Antenna Communications Networks

Daniel W. Bliss (Arizona State University) and Siddharta Govindasamy (F.W. Olin College of Eng.)

In this tutorial, we discuss the future of advanced wireless networking based on sophisticated adaptive nodes that can mitigate network interference. The tutorial is vertical in that it addresses issues ranging from signal processing approaches and practical protocol issues to theoretical bounds on performance. Interference mitigation approaches including multiple-input multiple-output (MIMO) links, multiuser detection, and interference alignment are discussed. A variety of network

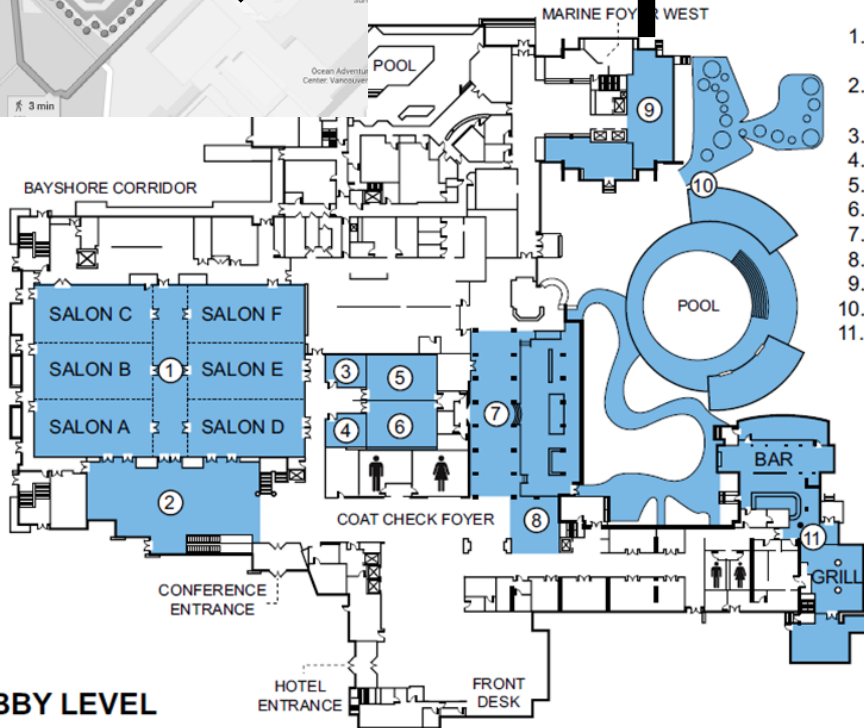
Cypress 1 (or *Covichan) (A)	Cypress 2 (B)	Oak 1 (C)	Oak 2 (D)	Prospect (or *Covichan) (E)	Arbutus (F)	Fir (G)	Fraser (H)	Thompson (I)	Seymour (J)	
SUNDAY 14 September										
7:30-17:30				Registration (Stanley Park Foyer Front)						
8:30-17:00			Tutorials, Workshops and other events: See separate program							
18:00-20:00			Welcome Reception (Stanley Park Ballroom)							
MONDAY 15 September										
7:30-17:30				Registration (Stanley Park Foyer Front)						
8:30-9:00			Opening Plenary: David Michelson & Ibrahim Gedeon, General Co-chairs; Fabrice LaBeau, VTS President; Aaron Gulliver & Robert Schrober, TPC Co-chairs (Baysshore Grand Ballroom Salon DEF)							
9:00-10:30			Keynote Industrial Plenary: 5G and Land Mobile Radio, Ibrahim Gedeon (Telus) and Wen Tong (Huawei) (Baysshore Grand Ballroom Salon DEF)							
10:30-11:00			Refreshments and Exhibits (Stanley Park Ballroom)							
11:00-12:30 (1)	WiVeC	Ad-hoc & Mesh Networks	Cognitive Radio I	Antennas & Radio Hardware	Wireless Networks I	Signal Processing for Localization & Communications	Channel Estimation & Compressed Sensing	Performance Evaluation I	Industry Track: Future Challenges - Mobile Radio Network Design and Optimization	
12:30-14:00				Lunch (Baysshore Grand Ballroom Salon DEF)						
14:00-15:30 (2)	WiVeC	Cognitive & Cooperative Networks	Cognitive Radio II	Channel Processing & Performance I	Performance Analysis I	Localization, Tracking & Applications	Interference I	Self Organized Networks (SON) & Network Virtualization	Industry Track: Millimeter-Wave Access Technologies for 5G	
15:30-16:00				Refreshments and Exhibits (Stanley Park Ballroom)						
16:00-17:30 (3)	Cooperative Communications I	MIMO I	Interference & Power Control	Channel Processing & Performance II	Performance Analysis II	Localization & Handoff Management in Mobile Networks	Interference II	Mobile Network Modelling & Performance Evaluation	Industry Track: The Challenge of Defining 5G	
18:00-20:00				Panel Discussion: Wireless Technologies for Freight Security and Efficiency (Baysshore Grand Ballroom Salon DEF)						
TUESDAY 16 September										
7:30-17:30				Registration (Stanley Park Foyer Front)						
8:30-9:15			Keynote Industrial Plenary: Autonomous and Connected Vehicles (Barrie Kirk, Executive Director Canadian Automated Vehicles Centre of Excellence-CAVCOE) (Baysshore Grand Ballroom Salon DEF)							
9:15-10:00			Keynote Industrial Plenary: Three Technologies That Will Change the World (Barry Einsig, Global Transportation Executive, CISCO Systems) (Baysshore Grand Ballroom Salon DEF)							
10:00-10:30			Refreshments and Exhibits (Stanley Park Ballroom)							
10:30-12:00 (4)	Algorithms, Analysis & Optimization (*)	MIMO II	Millimeterwave & Power Line Communications	Channels & Models I	Mobile Networks Analysis	Wireless Networks II	Coding & Decoding	Power Control	Industry Track: Autonomous Vehicles	
12:00-13:30				Awards Lunch (Baysshore Grand Ballroom Salon DEF)						
13:30-15:00 (5)	Multimedia Service Provisioning in Mobile Networks (*)	Relay Networks	MIMO Systems II	Channels & Models II	Multimedia Transmission & VANET	Wireless Communications	Modulation	Interference Channels	Industry Track: Connected Vehicles	
15:00-15:30				Refreshments and Exhibits (Stanley Park Ballroom)						
15:30-17:00 (6)	Information Distribution Services (*)	Smart Grid, Electric Vehicles & Vehicular Electronics	Cognitive Radio & M2M	Channels & Models III	VANET	Two-way Relaying Transmissions	Receiver & Transceiver Techniques	Spatial Modulation & Visible Light Communication	Industry Track: Automated and Connected Vehicles	
18:00-22:00				VTC2014-Fall Banquet aboard the Magic Spirit Yacht (Departs dock promptly at 18:00)						
WEDNESDAY 17 September										
7:30-17:30				Registration (Stanley Park Foyer Front)						
8:30-10:00 (7)	Spectrum Sensing I	Cognitive Radio & D2D Communication	Relay & Cooperative Systems	Energy-Efficient Resource Allocation (*)	Performance Evaluation II	Synchronization & Equalization	Antenna Propagation, Channel Measurement	Network Coding & Physical Layer Security	Industry Panel: Electric Vehicles & Vehicular Electronics	
10:00-10:30				Refreshments and Exhibits (Stanley Park Ballroom)						
10:30-12:00 (8)	Spectrum Sensing II	Resource Allocation	Vehicular Communications	Green Cellular Networks (*)	Networks Simulation	Wireless LAN	Cooperative Communications II	MIMO Relaying Systems	Industry Track: Electric Vehicle Charging Initiatives in BC	
12:00-13:30				Lunch (Baysshore Grand Ballroom Salon DEF)						
13:30-15:00 (9)	Green Communications	New Access Schemes in Cognitive Radio	Precoder Design & Multiple Access	Wireless Networks (*)	Performance Analysis of Mobile Networks	Carrier Frequency Offset & Phase Noise	Cooperative Communications III	Wireless Sensor Networks	Industry Track: Workshop on Automotive EMC	
15:00-15:30				Refreshments and Exhibits (Stanley Park Ballroom)						
15:30-17:00 (10)	Distributed MIMO	Resource Allocation in Cognitive Radio	Broadcast & Multiple Access	Resource Management (*)	Performance Analysis III	Channel Measurements & Modelling	Routing	Security & Privacy in Wireless Network	Industry Track: Workshop on Automotive EMC	

Boarding point



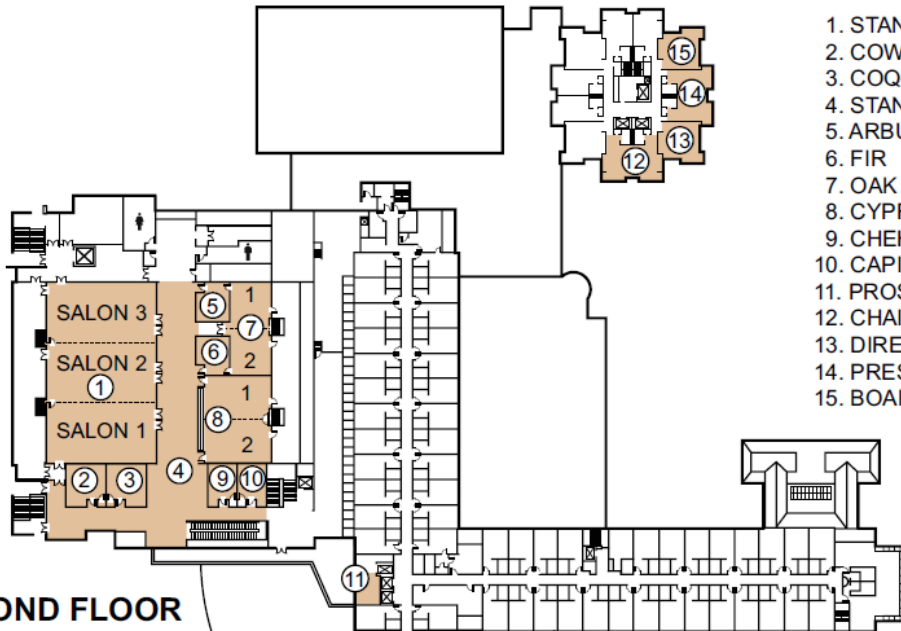
Floor Plans

Exit for walk to banquet (one block along dock)



1. BAYSHORE GRAND BALLROOM
2. BAYSHORE BALLROOM FOYER
3. FRASER
4. THOMPSON
5. MACKENZIE
6. SEYMOUR
7. CURRENTS
8. STANLEY PERKS FOYER
9. MARINE
10. POOL AND GARDEN AREA
11. SEAWALL BAR AND GRILL

LOBBY LEVEL



1. STANLEY PARK BALLROOM
2. COWICHAN
3. COQUITLAM
4. STANLEY PARK FOYER
5. ARBUTUS
6. FIR
7. OAK ROOM
8. CYPRESS ROOM
9. CHEHALIS
10. CAPILANO
11. PROSPECT
12. CHAIRMAN
13. DIRECTOR
14. PRESIDENT
15. BOARDROOM

SECOND FLOOR

scaling bounds are introduced. Network performance bounds that employ asymptotic random matrix theory are also introduced. Example applications discussed include ad hoc networks and cellular networks with large antenna arrays. The tutorial will draw in part upon our recently published textbook “Adaptive Wireless Communications: MIMO Channels and Networks.” The tutorial will be self-contained, so that attendees will not need to reference the book during the tutorial; however, for those that wish to review concepts presented in the tutorial or delve into topics in greater depth, the textbook will enable further investigation.

Daniel W. Bliss is an Associate Professor in the School of Electrical, Computer and Energy Engineering at Arizona State University. His current research topics include statistical signal processing, multiple-input multiple-output (MIMO) wireless communications, MIMO radar, cognitive radios, radio network performance bounds, geolocation techniques, channel phenomenology, and signal processing and machine learning for anticipatory physiological monitoring. Dan has been the principal investigator on numerous programs with applications to radio, radar, and medical monitoring. Previously (1997-2012), Dan was a senior member of the technical staff at MIT Lincoln. Dan received his Ph.D. and M.S. in Physics from the University of California at San Diego (1997 and 1995), and his BSEE in Electrical Engineering from Arizona State University (1989). Employed by General Dynamics (1989-1993), he designed avionics for the Atlas-Centaur launch vehicle, and performed magnetic field calculations and optimization for high-energy particle-accelerator superconducting magnets. His doctoral work (1993-1997) was in the area of high-energy particle physics.

Siddharta Govindasamy is an Assistant Professor of Electrical and Computer Engineering at the F. W. Olin College of Engineering. He received the S.B. and M. Eng. degrees from MIT in 1999 and 2000, respectively. From 2000 to 2003, he was with Aware Inc., first as a DSP Engineer and then as a Senior DSP engineer where he conducted research and development of digital subscriber line modems. He completed his Ph.D. at the Research Laboratory of Electronics at MIT in 2008, and has been with Olin College since then.

Sunday 14 September 2014, 13:30–17:00 Oak 1

T6: Dedicated Short Range Vehicular Communications: Overview, Technical Challenges, and Applications

John Kenney and Gaurav Bansal (Toyota InfoTechnology Center, USA)

In this tutorial we cover the most important aspects of Dedicated Short Range Communications (DSRC), also known as Cooperative ITS. This technology is in the early stages of deployment in North America, Europe, and other regions. The US DOT plans to require DSRC in new vehicles in the coming years. DSRC is used to communicate vehicle-to-vehicle (V2V) and vehicle-to/from-infrastructure (V2I), enabling a set of compelling safety, mobility, automated driving, and environmental applications. This tutorial focuses on the safety and automated driving use cases. We explain the DSRC protocol stack, collision

avoidance applications, and technical challenges for deployment. We discuss large-scale field tests and early deployment projects in the US, Europe, and Japan, e.g. the US Safety Pilot and the Rotterdam-Vienna Corridor Project. After presenting DSRC basics, we focus on a specific research problem that is currently of great interest: DSRC Channel Congestion. We discuss the merits of various approaches to address congestion, including avoidance and active control, as well as control modalities (message rate, transmit power, etc.). As a case study we present our specific research on adaptive message rate control, which is under consideration for standardization in the US and Europe. We end the tutorial with a discussion of the role DSRC can play in support of automated vehicles, including a framework for communicating dynamic road conditions to nearby vehicles. The primary goal of the tutorial is to empower the attendee to participate in this important emerging technology, whether as a researcher, a developer, or a planner.

Dr. John B. Kenney: John holds electrical engineering degrees from Stanford and Notre Dame, where he also served as Adjunct Professor. Currently a Principal Researcher at the Toyota InfoTechnology Center in Mountain View, CA, he has researched vehicular communications since 2007. John represents Toyota in the automakers' Vehicle Safety Communication consortium, including as past lead of the VSC-A Communications Task. He and Dr. Bansal actively contribute to VSC research in congestion control and security. He also represents the industry in the investigation of potential sharing of spectrum between DSRC and unlicensed devices, including recent testimony before a US Congressional committee. He is active in IEEE and European standards, and serves as an elected officer of the SAE DSRC Technical Committee. He co-chaired the 2011 and 2012 ACM VANET Workshops, and the IEEE SmartVehicles 2014 Workshop. He also authored an invited Proceedings of the IEEE paper on DSRC Standards in the US (2011).

Dr. Gaurav Bansal: Gaurav received a B.Tech. degree from Indian Institute of Technology (IIT) Kanpur, India and a Ph.D. degree from the University of British Columbia (UBC), Canada. From August 2007 to July 2008, he worked as a Research Intern with Mercedes Benz Research and Development North America Inc., Palo Alto, CA. He joined Toyota InfoTechnology Center, USA, in July 2010 where he currently works as a Senior Researcher in the Network Group. He is a recipient of Natural Science Engineering and Research Council of Canada's Alexander Graham Bell Scholarship. He is Demonstrations Chair for the 2014 WiVEC Symposium, and has served as a TPC member for several international conferences including IEEE VTC2014-Fall, CSCITA-2014, COMSNETS 2014, and SmartVehicles '14. He also serves on the Editorial board of IEEE Communication Surveys and Tutorials.

The following tutorial originally planned has been cancelled:

T7: Efficient 3D EM Antenna Modelling for Vehicular Applications

Winfried Simon and Christos Oikonomopoulos-Zachos, IMST GmbH

VTC2014-Fall Technical Program

Monday 15 September 2014

Monday, 15 September 2014 11:00-12:30 Cypress 2

1B: MIMO Systems I

Chair: Salama Ikki

- 1 Low Complexity Linear Receivers for mmWave LOS-MIMO Systems with Uniform Circular Arrays**
Liang Zhou, Yoji Ohashi, Fujitsu Laboratories Ltd.
- 2 Analysis of Channel Non-reciprocity due to Transceiver and Antenna Coupling Mismatches in TDD Precoded Multi-user MIMO-OFDM Downlink**
Yaning Zou, Orod Raeesi, Tampere University of Technology; Risto Wichman, Aalto University; Antti Tolli, University of Oulu; Mikko Valkama, Tampere University of Technology
- 3 Low-Complexity Multiuser MIMO Downlink User Selection Based on Large-Scale Fading**
Haijing Liu, Hui Gao, Tiejun Lv, Beijing University of Posts and Telecommunications
- 4 Modified Mutual Superposition Transmission with Complexity-Reduced Detection for Spatial Multiplexing OFDM Systems**
Kei Kaiho, Takahiko Saba, Chiba Institute of Technology
- 5 Power Efficient MIMO SC-FDE Transmission using Magnitude Modulation Techniques**
João Gante, Marco Gomes, Instituto de Telecomunicações - University of Coimbra; Rui Dinis, Universidade Nova de Lisboa; Vitor Silva, Francisco Cercas, Instituto de Telecomunicações - University of Coimbra

Monday, 15 September 2014 11:00-12:30 Oak 1

1C: Ad-hoc & Mesh Networks

Chair: Ahmed B. Altamimi

- 1 On Network Coding in Intermittently Connected Networks**
Ahmed B Altamimi, Aaron Gulliver, University of Victoria
- 2 A Probabilistic Energy-aware Routing Protocol for Wireless Body Area Networks**
Md Tanvir Ishtaique ul Huque, The University of Sydney; Kumudu Munasinghe, University of Canberra; Abbas Jamalipour, University of Sydney
- 3 Optimal and Fair Rate Adaptation in Wireless Mesh Networks Based on Mathematical Programming and Game Theory**
Pieter Jansen van Vuuren, University of Pretoria; Attahiru Sule Alfa, University of Manitoba; Sunil Maharaj, University of Pretoria
- 4 Best Route, Error Broadcast: A Content-Centric Forwarding Protocol for MANETs**
Han Hailong, Wu Muqing, Hu Qian, Wang Ning, Beijing University of Posts and Telecommunications
- 5 Distributed Flow Permission Inspection for Mission-Critical Communication of Untrusted Autonomous Vehicles**
Patrick-Benjamin Böck, Katharina Siobhan Kohls, Daniel Behnke, Christian Wietfeld, TU Dortmund University

Monday, 15 September 2014 11:00-12:30 Oak 2

1D: Cognitive Radio I

Chair: Yukitoshi Sanada

- 1 Window Functions for Frame Correlation Reduction in Overlapped FFT based Energy Detection**
Ryo Takai, Shoya Uchida, Yukitoshi Sanada, Keio University

2 Service Time Analysis of Secondary Packet Transmission with Opportunistic Channel Access

Muneer Usman, Hong-Chuan Yang, University of Victoria; Mohamed-Slim Alouini, KAUST

3 Thompson Sampling for Opportunistic Spectrum Access with Markovian Rewards

Suleman Alnatheer, Hong Man, Stevens Institute of Technology

4 An Efficient Cooperation Strategy and Cooperation Region Analysis in Cognitive Femtocell Networks

Eunhye Heo, Hyuncheol Park, Korea Advanced Institute of Science and Technology; Shihab Jimaa, Khalifa University

5 Centralized Collusion Attack in Cognitive Radio Collaborative Spectrum Sensing

S. Ali Mousavifar, Cyril Leung, The University of British Columbia

Monday, 15 September 2014 11:00-12:30 Prospect

1E: Antennas & Radio Hardware

Chair: Geoffrey Messier

1 A Periodic Metallic Antenna for High Wireless Communication Performances

Farid Ghanem, Centre de Développement des Technologies Avancées

2 Base Station Antenna Pattern Distortion in Practical Urban Deployment Scenarios

Ignacio Rodriguez, Huan Cong Nguyen, Troels B. Sørensen, Ondrej Franek, University of Aalborg

3 Towards a Wireless Battery Management System: Evaluation of Antennas and Radio Channel Measurements Inside a Battery Emulator

Damián Alonso, Oliver Opalko, Martin Sigle, Klaus Dostert, Karlsruhe Institute of Technology (KIT)

4 Tunable Design for LTE Mobile-Phones

Samantha Caporal Del Barrio, Pevand Bahramzy, Aalborg University; Simon Svendsen, Ole Jagielski, Intel Mobile Communications; Gert F. Pedersen, Aalborg University

Monday, 15 September 2014 11:00-12:30 Arbutus

1F: Wireless Networks I

Chair: Lajos Hanzo

1 Maximum Multipath Routing Throughput in Multirate Wireless Mesh Networks

Jalaluddin Qureshi, Namal College; Chuan Heng Foh, University of Surrey; Jianfei CAI, Nanyang Technological University

2 Coordinated Scheduling in Downlink Multi-cell OFDMA Networks

Ling Zhang, Xiangming Wen, Ting Xu, Zhaoming Lu, Jun Zhao, Shenghua He, Beijing University of Posts and Telecommunications

3 Multi-Cell Coordinated Scheduling and Power Allocation in Downlink LTE-A Systems

Jian Yu, Beijing University of Posts and Telecommunications; Geoffrey Y. Li, Georgia Tech; Changchuan Yin, Beijing University of Posts and Telecommunications; Suwen Tang, Xiaolong Zhu, Huawei Shanghai Research Institute

4 Impact of Antenna Configuration on Feedback Generation for non-ideal CoMP Transmission

Stanislaus Iwelski, Zijian Bai, Erfan Majeed, Guido Bruck, Peter Jung, University of Duisburg-Essen

Monday, 15 September 2014 11:00-12:30 Fir

1G: Signal Processing for Localization & Communications

Chair: *Otman Basir*

1 Modified Zero-Padding Method for Fast Long PN-Code Acquisition

Jun Ping, Xiaofu Wu, Jun Yan, Nanjing University of Posts and Telecommunications

2 Unambiguous BOC Signal Tracking Based on Partial Correlations

Keunhong Chae, Sungkyunkwan University; Huaping Liu, Oregon State University; Seokho Yoon, Sungkyunkwan University

3 Modified Leaky LMS Algorithms Applied to Satellite Positioning

Jean-Philippe Montillet, The Australian National University; Kegen Yu, University of New South Wales

4 A Novel Routing Algorithm Design of Time Evolving Graph Based on Pairing Heap for MEO Satellite Network

Yupeng Wang, Gong Zhang, Zhuqing Jiang, Chengkai Huang, Xueyang Wang, Aidong Men, Bo Yang, Kaifeng Qi, Beijing University of Posts and Telecommunications

5 Range-free Localization Algorithm for Anisotropic Wireless Sensor Networks

Ahmad, Slim Zaidi, Sofiene Affes, INRS-EMT; Nahi Kandil, University of Québec, Abitibi-Témiscamingue

Monday, 15 September 2014 11:00-12:30 Fraser

1H: Channel Estimation & Compressed Sensing

Chair: *Claude D'Amours*

1 A Novel Sparse Channel Estimation Method Based on Discriminant Analysis for OFDM System

Baohao Chen, Cui Qimei, Fan Yang, Jin Xu, Beijing University of Posts and Telecommunications

Monday, 15 September 2014 14:00-15:30 Cypress 2

2B: Massive MIMO Systems

Chair: *Witold Krzymien*

1 Forward-link Sum Rate Analyses for Massive MIMO Systems with Time-shifted Pilots

Zheng Li, Shi Jin, Xiaoyu Wang, Southeast University; Kai-Kit Wong, University College London; Yongming Huang, Southeast University

2 Low-Complexity MMSE Signal Detection Based on Richardson Method for Large-Scale MIMO Systems

Xinyu Gao, Linglong Dai, Tsinghua University; Chau Yuen, Singapore University of Technology and Design; Zhaocheng Wang, Tsinghua University

3 Pilot Contamination Reduction Using Time-Shifted Pilots in Finite Massive MIMO Systems

Wan Amirul Wan Mohd Mahyiddin, Philippa A. Martin, University of Canterbury; Peter J. Smith, University Of Canterbury

4 Multipair Two-Way Relay Networks with Very Large Antenna Arrays

Mengmeng Liu, Zhang Jianhua, Qiang Wang, Zhang Ping, Beijing University of Posts and Telecommunications

5 A Macro Cellular Wireless Network with Uniformly High User Throughputs

Hong Yang, Thomas L. Marzetta, Bell Labs, Alcatel-Lucent

2 Channel Estimation Using Subspace Decomposition for SC-FDMA Systems

Claude D'Amours, University of Ottawa, SITE; Benoit Champagne, McGill University; Adel Omar Dahmane, Université du Québec à Trois-Rivières; Ashraf Tahat, PSUT

3 A Maximum-Likelihood Channel Estimator in MIMO Full-Duplex Systems

Ahmed Masmoudi, McGill; Tho Le-Ngoc, McGill University

4 A Variational Bayesian EM Approach to Structured Sparse Signal Reconstruction

Shaoyang Li, Xiaoming Tao, Jianhua Lu, Tsinghua University

5 Multidimensional Compressive Sensing Based Analog CSI Feedback for Massive MIMO-OFDM Systems

Peng Cheng, Zhuo Chen, CSIRO

Monday, 15 September 2014 11:00-12:30 Thompson

1I: Performance Evaluation I

Chair: *Ioannis Chatzigeorgiou*

1 Design of millimeter wave hybrid beamforming systems

Girim Kwon, Yeonggyu Shim, Hyuncheol Park, Korea Advanced Institute of Science and Technology; Hyuck M. Kwon, Wichita State University

2 A New Transmit Beamforming Technique for Physical-Layer Multicasting in Cellular Downlink Systems

Chang Lung Hsiao, ITRI; Jiann-Ching Guey, Mediatek; Wern-Ho Sheen, National Chung Cheng University; Ren-Jr Chen, Industrial Technology Research Institute

3 Analysis of Threshold-Based Selection Diversity Receivers

Petros Bithas Athanasios A. Rontogiannis, National Observatory of Athens

4 BER Performance of Local Average Gain Combining with BPSK in Rayleigh Fading Channels

Peng Liu, Nemanja Stefan Perović, Johannes Kepler University; Andreas Springer, University of Linz

Monday, 15 September 2014 14:00-15:30 Oak 1

2C: Cognitive and Cooperative Networks

Chair: *Sachitha Kusaladharma*

1 On Buffer-Assisted Opportunistic Routing Relying on Linear Transmission Activation Probability Space Partitioning for Relay-Aided Networks

Chen Dong, Jing Zuo, Lie-Liang Yang, Yongkai Huo, Soon Xin Ng, Lajos Hanzo, University of Southampton

2 An Achievable Throughput Capacity of Three-Dimensional Inhomogeneous Wireless Networks

Guang Bai, Li Yu, Qiuming Liu, Huazhong University of Science and Technology (HUST)

3 Close-Coupled Chips Can Coordinate to Contain Collisions

Chandrika J. Satyavolu, Mahendran Veeramani, Sridhar Radhakrishnan, Jessica Ruyle, University of Oklahoma

4 Distributed Mobile Femto-Databases for Cognitive Access to TV White Spaces

Luca Bedogni, Marco Di Felice, Angelo Trotta, Luciano Bononi, University of Bologna

5 Spectrum-Aggregating Cognitive Multi-Antenna User with Multiple Primary Users

Ahmed El Shafie, Nile University; Tamer Khattab, Qatar University

Monday, 15 September 2014 14:00-15:30 Oak 2

2D: Cognitive Radio II

Chair: *Hong-Chuan Yang*

1 A DC Offset Adaptive Energy Detection Algorithm

Yunhai Fu, Lin Ma, Yubin Xu, Yong Wang, Harbin Institute of Technology

2 A Novel Clock Synchronization Scheme for Hybrid Overlay/Underlay Spectrum Access Based Cognitive Radio Networks

Fang-Jian Han, Li Yu, Keyu Wu, National University of Defense Technology

3 A Self-adapting Symbol Rate Estimator Based on Wavelet Transform with Optimal Scale and Resample

Yang Ding, Zan Li, JiangBo Si, Fuhui Zhou, Benjian Hao, Xidian University

4 A Punishment Policy for Spectrum Sensing Data Falsification Attackers in Cognitive Radio Networks

Saud Althunibat, Birabwa J. Denise, Fabrizio Granelli, University of Trento

5 Distributed Coalition Formation and Bandwidth Allocation in Ad Hoc Cognitive Radio Networks

Raza Umar, Wessam Mesbah, King Fahd University of Petroleum and Minerals

Monday, 15 September 2014 14:00-15:30 Prospect

2E: Channel Processing & Performance I

Chair: David Matolak

1 Adaptive Channel Quantization on TDD Reciprocity Performance of Relative Antenna Calibration

Umut Ugurlu, Risto Wichman, Aalto University; Cássio Ribeiro, Nokia Research Center; Carl Wijting, Nokia

2 Evaluation of Vehicular Communication Performance at Street Intersections

Kim Mahler, Panagiotis Paschalidis, Mike Wisotzki, Andreas Kortke, Wilhelm Keusgen, Fraunhofer Heinrich Hertz Institute

3 Pilot-Assisted Channel Estimation for OFDM Systems in Time-Varying Multipath Channels

Naosuke Ito, Daisuke Shimbo, Naotoshi Maeda, Hidetoshi Mishima, Mitsubishi Electric Corporation; Hiroyuki Nakayama, Tokushima Bunri University

4 On the First- and Second-Order Statistics of Selective Combining Over Double Nakagami-m Fading Channels

Rym Khedhiri, Nazih Hajri, Neji Youssef, Ecole Supérieure des Communications de Tunis; Matthias Paetzold, University of Agder

5 Optimal Sampling Period and Required Number of Samples for OSTBC-MIMO Rayleigh Fading Channel Capacity Simulators

Rym Hicheri, Ecole Supérieure des Communications de Tunis; Matthias Pätzold, University of Agder; Néji Youssef, Ecole Supérieure des Communications de Tunis

Monday, 15 September 2014 14:00-15:30 Arbutus

2F: Performance Analysis I

Chair: Yanan Qi

1 Narrowband LTE-M System for M2M Communication

Rapeepat Ratasuk, Nitin Mangalvedhe, Nokia; Amitava Ghosh, Benny Vejlgaard, Nokia Networks

2 The Shielding-Effectiveness Based Magnetic Field Shielding Theory and Its Application in Mobile Payment Systems

Yejun He, Jiefeng Ao, Jie Yang, Xiaorong Tang, Shenzhen University

3 On the Physical Layer Design for Low Cost Machine Type Communication in 3GPP LTE

Yinan Qi, Ayesha Ijaz, University of Surrey; Matthew Webb, Yuichi Morioka, Sony Europe Ltd; Atta Qudus, Muhammad Ali Imran, Pirabakaran Navaratnam, Yi Ma, Rahim Tafazolli, University of Surrey

4 A Novel Mathematical Morphology Based Antenna Deployment Scheme for Indoor Wireless Coverage

Han Xu, China Ship Development and Design Center; Zhongyuan Lai, Jiangnan University

5 Node Energy Consumption Analysis in Wireless Sensor Networks

Feng Luo, Chunxiao Jiang, Tsinghua University; Haijun Zhang, Beijing University of Chemical Technology; Xuexia Wang, Yong Ren, Tsinghua University

Monday, 15 September 2014 14:00-15:30 Fir

2G: Localization, Tracking & Applications

Chair: Homayoun Najjaran

1 Unknown Transmit Power Energy-based Source Localization in Wireless Sensor Networks

Hannan Lohrasbipeydeh, Aaron Gulliver, University of Victoria

2 Cellular Network Fingerprint Localization Simulation: A Soft Computing Approach

Nabil Drawil, University of Tripoli; Haitham Amar, Otman Basir, University of Waterloo

3 A Feature Selection Method based on the Sparse Multi-Class SVM for Fingerprinting Localization

Pan Li, Huadong Meng, Xiqin Wang, Tsinghua University

4 Mobile Sensors Deployment Subject to Measurement Error

Hamid Mahboubi, Mojtaba Vaezi, Fabrice Labeau, McGill University

5 A Motion Planning Scheme for Automated Wildfire Suppression

Ali Mohandes, Morteza Farrokhsiar, Homayoun Najjaran, The University of British Columbia

Monday, 15 September 2014 14:00-15:30 Fraser

2H: Interference I

Chair: Salama Ikki

1 Inter-Relay Interference Mitigation for AF-based Successive Relay Systems

Ming Jiang, Sun Yat-sen University; Weikun Hou, The University of Western Ontario

2 Interference Mitigation via CECRS Precoding in a Two-Tier Heterogenous Network with Cooperative Femtocells

Datong Xu, Pinyi Ren, Qinghe Du, Li Sun, Xi'an Jiaotong University

3 Interference Neutralization and Alignment in Cognitive Relay assisted 3-User Interference Channels

Shu Yuquan, Qiang Wang, Dong Shao, Zhang Jianhua, BUPT

4 Optimization of Interference Alignment in MIMO Channel with Multiple Layers of Relays

Yi Wei, Lok Tat-Ming, The Chinese University of Hong Kong

5 System Performance Analysis of Interference Alignment with Limited Feedback in Poisson Field

Hu Langtao, Chaowei Yuan, BUPT

Monday, 15 September 2014 14:00-15:30 Thompson

2I: Self Organized Networks (SON) & Network Virtualization

Chair: Gerhard Fettweis

1 Comparing Online and Offline SON Solutions for Concurrent Capacity and Coverage Optimization

Sascha Berger, Albrecht Fehske, University of Technology Dresden; Paolo Zanier, Nokia Solutions and Networks; Ingo Viering, Nomor Research GmbH; Gerhard Fettweis, Technische Universität Dresden

2 Comparison of Abstract Resource Management Model for SON algorithm of eICIC with Real Radio Resource Management

Fasil Berhanu Tesema, Nokia Solutions and Networks, Technical University of Dresden; Paolo Zanier, Nokia Solutions and Networks; Ingo Viering, Nomor Research GmbH; Albrecht Fehske, Gerhard Fettweis, Technische Universität Dresden

3 Coordinating SON Instances: A Reinforcement Learning Framework

Ovidiu Iacoboaiea, Orange Labs and Telecom ParisTech; Berna Sayrac, Sana Ben Jemaa, France Telecom Orange Labs; Pascal Bianchi, Telecom ParisTech

4 A Reinforcement Learning based solution for Self-Healing in LTE networks

Jessica Moysen, Lorenza Giupponi, CTTC

Monday, 15 September 2014 16:00-17:30 Cypress 1

3A: Cooperative Communications I

Chair: Ioannis Chatzigeorgiou

1 Conditions for Cooperative Transmission on Rayleigh Fading Channels

Ioannis Chatzigeorgiou, Lancaster University

2 Performance analyses of two-way AF relaying over Nakagami-m frequency-selective fading channels

Szu-Liang Wang, Tsan-Ming Wu, Chung Yuan Christian University

3 Outage Analysis of Dual-Hop Transmission with Buffer Aided Amplify-and-Forward Relay

Guan-Xing Li, China Mobile Group Liaoning Ltd.; Chen Dong, University of Southampton; Dong Liu, University of Science and Technology of China; Guangtao Li, China Mobile Group Liaoning Ltd.; Yonghui Zhang, RF Micro Devices Co. Ltd., Beijing

4 Switch-and-Examine Relaying Scheme for Cognitive AF Relay Networks in Rayleigh Fading Channels

Anas Salhab, Salam A. Zummo, King Fahd University of Petroleum and Metal

5 Threshold-based Detection for Amplify-and-Forward Cooperative Communication Systems with Channel Estimation Error

Abdulrahman Abuzaid, Qasim Z. Ahmed, Mohamed-Slim Alouini, King Abdullah University of Science and Technology

Monday, 15 September 2014 16:00-17:30 Cypress 2

3B: Heterogeneous Networks

Chair: Marcin Rybakowski

1 E-DCH Decoupling for Downlink-Uplink Imbalance Mitigation in HSPA Heterogeneous Networks

Marcin Rybakowski, Amaanat Ali, Karol Drazynski, Nokia Networks; Alexey Trushanin, Maxim Vechkanov, Vyacheslav Shumilov, Roman Maslennikov, University of Nizhny Novgorod

2 Link Imbalance in HSPA+ Heterogenous Networks - Quantifying the phenomenon of uplink and downlink link imbalance

Amaanat Ali, Marcin Rybakowski, Thomas Höhne, Petri Jolma, Karol Drazynski, Nokia Networks

3 Uplink Inter-Site Carrier Aggregation Between Macro and Small Cells in Heterogeneous Networks

Hua Wang, Aalborg University; Claudio Rosa, Klaus I. Pedersen, Nokia Networks

4 On Delay Compensation for HSPA+ HetNet Decoupling

Ke Wang, Yongyu Chang, Chi Zhang, Dacheng Yang, Beijing University of Posts and Telecommunications

5 Joint Frequency and Time Domain based eICIC for better CRE Application in HetNets

Emna Fakhfakh, Soumaya Hamouda, Sami Tabbane, Sup`Com Tunis

Monday, 15 September 2014 16:00-17:30 Oak 1

3C: MIMO I

Chair: Fumiyuki Adachi

1 Efficient and Accurate Semiblind Estimation of MIMO-OFDM Doubly-Selective Channels

Alireza Movahedian, Michael McGuire, University of Victoria

2 Efficient Estimation and Compensation of Transceiver Non-reciprocity in Precoded TDD Multi-User MIMO-OFDM Systems

Yaning Zou, Orod Raeesi, Mikko Valkama, Tampere University of Technology

5 A Dynamic Embedding Algorithm for Wireless Network Virtualization

Jonathan van de Belt, Hamed Ahmadi, Linda Doyle, Trinity College Dublin

3 Channel and Noise Covariance Matrix Estimation for MIMO Systems with Optimal Training Design

Mohamed Lassaad Ammari, Paul Fortier, Mohamad El Khaled, Laval University

4 A Novel Analog Signal Transmission using Joint Space-Time Transmit Diversity and Receive Antenna Diversity

Hai Thanh Vo, Shinya Kumagai, Fumiyuki Adachi, Tohoku University

5 Non-orthogonal Multiple Access Using Intra-beam Superposition Coding and SIC in Base Station Cooperative MIMO Cellular Downlink

Nobuhide Nonaka, Tokyo University of Science; Yoshihisa Kishiyama, NTT DoCoMo, Inc.; Kenichi Higuchi, Tokyo University of Science

Monday, 15 September 2014 16:00-17:30 Oak 2

3D: Interference & Power Control

Chair: Jinho Choi

1 A Component-level Soft Interference Cancellation Based Iterative Detection Algorithm for Coded MIMO Systems

Jin Xu, Beijing University of Posts and Telecommunications; Weiguo Ma, Xiaoming Dai, China Academic of Telecommunication Technology,

2 Aggregate Interference Analysis for Interweave Cognitive Networks

Sachitha Kusaladharna, Prasanna Herath, Chintha Tellambura, University of Alberta

3 Interference Alignment for VFDMA Based Uplink Transmission in Two-Tiered Networks

Zhonglin Xu, Wei Liu, Jiandong Li, Qin Liu, Xidian University; Chuan Li, Peng-Yu Huang, Xidian University

4 Bi-Channel-Connected Topology Control in Cognitive Radio Networks

Daosenzhai, Xijun Wang, Min Sheng, Yan Zhang, University of Xidian

5 Impact of Transmit Power Control and Receiver Association on Interweave Network Interference

Sachitha Kusaladharna, Prasanna Herath, Chintha Tellambura, University of Alberta

Monday, 15 September 2014 16:00-17:30 Prospect

3E: Channel Processing & Performance II

Chair: Hans-Jurgen Zepernick

1 Time-Domain Oversampled Receiver for OFDM in Underwater Acoustic Communication

Zhenrui Chen, Jintao Wang, Jian Song, Tsinghua University

2 Polarized Wireless Channel Simulator

Seok-Chul Kwon, Gordon Stüber, Georgia Institute of Technology

3 The Cumulative Distribution Function for the Joint Fading and Two Path Shadowing Channel : Expression and Application

Indrakshi Dey, Geoffrey Messier, Sebastian Magierowski, University of Calgary

4 On the Effect of Realistic Traffic Demand Rise on LTE-A HetNet Performance

Julien Stéphan, Mathieu Brau, Yoann Corre, Yves Lostanlen, SIRADEL

5 Heterogeneous Network Evolution Studies for a Dense Urban High Rise Scenario

Laura Luque Sanchez, Aalborg University; Michal Maternia, Benny Vejlgaard, P. E. Mogensen, Nokia Networks

Monday, 15 September 2014 16:00-17:30 Arbutus

3F: Performance Analysis II

Chair: Geoffrey Messier

- 1 A PDF-based Capacity Analysis of Diversity Reception Schemes over Composite Fading Channels using a Mixture Gamma Distribution**
Jaehoon Jung, Sang-Rim Lee, Haewook Park, Inkyu Lee, Korea University
- 2 Capacity Analysis of Continuous-Time Time-Variant Asynchronous Uplink Wideband CDMA System**
Tan Tai Do, Tobias Oechtering, Su Min Kim, Royal Institute of Technology (KTH); Gunnar Peters, Huawei Technologies Sweden AB
- 3 Gaussian Class Multivariate α - μ Distribution: Theory and Applications over Correlated Fading Channels**
Ibrahim Ghareeb, Amani Atiani, Jordan University of Science and Technology
- 4 Tight Bound on the Error Probability of Rotation Code in Rayleigh Fading Channels**
Ali Zarei Ghanavati, Daniel Lee, Simon Fraser University
- 5 Performance Analysis of BPSK over Joint Fading and Two-Path Shadowing Channels**
Indrakshi Dey, Geoffrey Messier, Sebastian Magierowski, University of Calgary

Monday, 15 September 2014 16:00-17:30 Fir

3G: Localization & Handoff Management in Mobile Networks

Chair: Deric Waters

- 1 Efficient RSSD-based Source Positioning with System Parameter Uncertainties**
Hannan Lohrasbipeydeh, Aaron Gulliver, University of Victoria
- 2 RSS-based Localization in Obstructed Environment with Unknown Path Loss Exponent**
Kejun Tong, Western University; Xianbin Wang, The University of Western Ontario; Arash Khabbazbasmenj, Western University; Anestis, Dounavis
- 3 Cooperative RSSI-based Indoor Localization: B-MLE and Distributed Stochastic Approximation**
Gemma Morral Adell, Télécom Paristech; Amy Dieng, Telecom Bretagne
- 4 Joint Design of Axis Alignment and Positioning for NLoS Indoor MmWave WLANs/WPANs**
Hongyun Chu, Pingping Xu, Sheng Jiang, Xingmiao You, Southeast University
- 5 A Self-adaption Handoff Mechanism for Multimedia Services in Mobile Cloud Computing**
Qi Qi, Jianxin Liao, Yufei Cao, Jingyu Wang, Beijing University of Posts and Telecommunications

Monday, 15 September 2014 16:00-17:30 Fraser

3H: Interference II

Chair: Boulos Wadhi Khoueiry

- 1 A Novel Destination Cooperation Scheme in Interference Channels**
Boulos Wadhi Khoueiry, M. Reza Soleymani, Concordia University
- 2 Effects of Interference Mitigation and Scheduling on Dense Small Cell Networks**
Victor Fernandez-Lopez, Aalborg University; Klaus I. Pedersen, Beatriz Soret, Nokia Networks
- 3 Error Exponent of Amplify and Forward Relay Networks in Presence of I.I.D. Interferers**
Bappi Barua, F. Safaei, University of Wollongong; Mehran Abolhasan, University of Technology Sydney
- 4 Cross-Tier Interference-Aware Scheduling for Heterogenous Uplink Transmission**
Liang Liu, Zhenning Shi, Orange Labs Beijing; Haibo Wang, Beijing University of Posts and Telecommunications; Daqing. Gu, Orange Labs Beijing
- 5 Interference Coordination for Co-channel Deployed Macrocell and Small Cell Cluster**
Li Tang, Yuancao Li, Li Chen, Sixing Yin, Shufang Li, Beijing University of Posts and Telecommunications

Monday, 15 September 2014 16:00-17:30 Thompson

3I: Mobile Network Modelling & Performance Evaluation

Chair: Reham Almesaeed

- 1 Performance Evaluation of 802.11 Standards Operating in TVWS and Higher Frequencies under Realistic Conditions**
Reham Almesaeed, Nor Fadzilah Abdullah, Angela Doufexi, Andrew Nix, University of Bristol
- 2 Performance Evaluation of LTE - Advanced Downlink in Inter and Intra Band Carrier Aggregation Under Mobility and Interference**
Reham Almesaeed, Araz Ameen, Angela Doufexi, Andrew Nix, University of Bristol
- 3 Experimental Analysis of Public Wireless LAN Quality for Moving Users**
Yasufumi Morioka, Morihiko Yoshifumi, Akira Yamada, Yukihiko Okumura, NTT DOCOMO, INC.
- 4 Transmit-receive diversity for secure connectivity in MIMO stochastic networks**
Juan Bai, Tao Xiaofeng, Na Li, Hu Yujia, Beijing University of Posts and Telecommunications
- 5 Spatial Traffic Distributions for Cellular Networks with Time Varying Usage Intensities per Land-Use Class**
Dennis M. Rose, Johannes Baumgarten, Thomas Kürner, Technische Universität Braunschweig

Tuesday 16 September 2014

Tuesday, 16 September 2014 10:30-12:00 Cowichan

4A: Algorithms, Analysis & Optimization

Chair: Yong Wang

- 1 A Generic Framework for Dynamic eICIC Optimization in LTE Heterogeneous Networks**
Nessrine Trabelsi, INRIA; Roullet Laurent, Alcatel Lucent Bell Labs france; Afef Feki, Alcatel Lucent Bell Labs France
- 2 Self-similarity Analysis of Mobile Instant Messaging Applications' Traffic And Server**
Qizhao Zhou, Beijing University of Posts and Telecommunications
- 3 Algorithms for Selecting Higher Wireless Connection-Capacity Routes**
Dilip Sarkar, University of Miami; Brandon Sato, University of Miami; Tutomu Murase, NEC Corporation
- 4 Q-Learning Based Cell Selection for UE Outage Reduction in Heterogeneous Networks**
Toshihito Kudo, Tomoaki Ohtsuki, Keio University
- 5 Synchronized Power Saving Mechanisms for Battery-Powered Mobile Terminals in Smart FiWi Networks**
Keisuke Miyanabe, University of Tohoku; Hiroki NISHIYAMA, Nei KATO, Tohoku University; Hirotaka Ujikawa, Ken-Ichi Suzuki, Naoto Yoshimoto, NTT Corporation

Tuesday, 16 September 2014 10:30-12:00 Cypress 2

4B: Small Cell Deployment

Chair: Witold Krzymien

- 1 Effective Small Cell Deployment with Interference and Traffic Consideration**
Yosub Park, Jihaeng Heo, Hyunsoo Kim, Yonsei University; Hano Wang, Sangmyung University, Korea; Sooyong Choi, Yonsei University; Takki Ryu, SK Telecom, Korea; Daesik Hong, Yonsei University
- 2 Impact of Modeling Tools on Outdoor Small-Cell Deployment Cost in a Realistic Urban Scenario**
Florian Letourneux, Sylvain Guivarch, Yves Lostanlen, SIRADEL
- 3 Coverage Optimization for Dense Deployment Small Cell Based on Ant Colony Algorithm**
Rui Han, Chunyan Feng, Hailun Xia, Yaguang Wu, Beijing University of Posts and Telecommunications
- 4 A Novel Base Stations-Mobile Stations Association Policy for Cellular Networks**
Prasanna Herath, University of Alberta; Witold A. Krzymien, University of Alberta / TRILabs; Chintha Tellambura, University of Alberta
- 5 A Picocell Deployment Case Study in a Mixed Multicarrier LTE Network**
William Hillery, Amitava Ghosh, Benny Vejlgaard, Nokia Networks; Zubo Huang, Chris Seagren, Roger Bartlett, Sprint Nextel Corporation

Tuesday, 16 September 2014 10:30-12:00 Oak 1

4C: MIMO II

Chair: Jinho Choi

- 1 Soft Decision Error Assisted Layered Multiuser Detectors for MIMO 2D Spread MC DS-CDMAs**
Hoang-Yang Lu, Taiwan Ocean University
- 2 Investigation on Beamforming Control Methods in Base Station Cooperative Multiuser MIMO Using Block-Diagonalized Beamforming Matrix**
Nobuhide Nonaka, Tokyo University of Science; Yuichi Kakishima, NTT DOCOMO, INC.; Kenichi Higuchi, Tokyo University of Science
- 3 A 2D Sorter-based K-best Algorithm for High Order Modulation MIMO Systems**
Thi Hong Tran, Kyushu Institute of Technology; Yuhei Nagao, Radrix Co. Ltd; Hiroshi Ochi, Kyushu Institute of Technology

4 Adaptive Modulation for Maximizing Practicable Sum Capacity in MU-MISO Downlink

S. Alireza Banani, University of Toronto; Zhuo Chen, Iain B. Collings, CSIRO; Rodney G. Vaughan, Simon Fraser University

5 Signaling-assisted MAP-based modulation classification in adaptive MIMO OFDM systems

Lars Haering, Christian Kisters, University of Duisburg-Essen

Tuesday, 16 September 2014 10:30-12:00 Oak 2

4D: Millimeterwave and Power Line Communications

Chair: Bo Gao

- 1 Energy-Efficient 1-Bit-Sampling Idle Listening Scheme for 60-GHz WLAN Systems**
Bo Gao, Tsinghua University; Zhenyu Xiao, Beihang University; Changming Zhang, Tsinghua University; Zhen Chen, Nanjing University; Depeng Jin, Lieguang Zeng, Tsinghua University
- 2 Experimental Demonstration of RF-Pilot-based Phase Noise Mitigation for Millimeter-wave Systems**
Jingjing Chen, Bengt-Erik Olsson, Anders Persson, Jonas Hansryd, Ericsson
- 3 Synchronization and Cell Searcher Design over OFDM Frame Structure Based on Millimeter Waves**
Heesang Chung, Electronics and Telecommunications Research Institute
- 4 Analyses and Modeling of Power Line Channel Attenuation Characteristics for Low Voltage Access Network in China**
Dong Shao, Qiang Wang, Beijing University of Posts and Telecommunications; Yang Lu, China Electric Power Research Institute (CEPRI); Yuquan Shu, Conglin Lai, Kangle Zhang, Beijing Univ. of Posts and Telecom.
- 5 Impact of System Components on an Automotive PLC Channel**
Elisabeth Georg, Norbert Hanik, Technische Universität München

Tuesday, 16 September 2014 10:30-12:00 Prospect

4E: Channels & Models I

Chair: Gerd Ascheid

- 1 Air-Ground Channel Characterization for Unmanned Aircraft Systems: the Hilly Suburban Environment**
David Matolak, Ruoyu Sun, University of South Carolina
- 2 3D mmWave Channel Model Proposal**
Timothy Thomas, Nokia Networks; Huan Cong Nguyen, Aalborg University; George R. MacCartney Jr., Theodore Rappaport, New York University
- 3 A spatially consistent radio channel model enabling dual mobility**
Vuokko Nurmela, Nokia Research Center; Pekka Kyösti, Anite Telecoms oy
- 4 Experimental Verification of the Non-Stationary Statistical Model for V2V Scatter Channels**
Michael Walter, Uwe-Carsten Fiebig, DLR (German Aerospace Center); Alenka Zajic, Georgia Institute of Technology
- 5 Study on Channel Correlation Using Temporal-Spectral-Spatial Information**
Yang Zhang, Lihua Pang, Jiandong Li, Xidian University

Tuesday, 16 September 2014 10:30-12:00 Arbutus

4F: Mobile Networks Analysis

Chair: Abdelhamid Mammeri

- 1 Analysis of Characteristics for Mode Switch of Dual-Mode Electro-Mechanical Transmission (EMT)**
Xiang Changle, Huang Kun, Ma Yue, Beijing Institute of Technology

2 Analysis of Coverage Efficiency of Radio-over-Fiber Network for Railway LOCOTROL Wireless Communication System

Tianyang Yuan, Hao Wu, Beijing Jiaotong University

3 Analysis of Medium Access Protocols for Power Line Communication realizing In-Car Networks

Thomas Gehrsitz, Technische Universität München; Helmut Kellermann, BMW Research and Development; Hyung-Taek Lim, BMW Group Research and Technology; Wolfgang Kellerer, Technische Universität München

4 Multi-hop Broadcasting in VANETs Integrating Intra-flow and Inter-flow Network Coding

Celimuge Wu, Satoshi Ohzahata, The University of Electro-communications; Yusheng Ji, National Institute of Informatics; Toshihiko Kato, The University of Electro-communications

5 V2X Protocols for Low-Penetration-Rate and Cooperative Traffic Estimations

Luca Foschini, Paolo Bellavista, Enrico Zamagni, University of Bologna

Tuesday, 16 September 2014 10:30-12:00 Fir

4G: Wireless Networks II

Chair: Shiwen He

1 Low Complexity Linear Precoding Scheme for Interference Management in Femtocell Networks

Ishtiaq Ahmad, Xiao Yan, Beijing University of Posts and Telecommunications; Muhammad Adnan, University of Management and Technology Lahore; Yuchi Zhang, Feng Zhiyong, Zhang Ping, Beijing University of Posts and Telecommunications

2 Analytical Results of Field Experiment on Precoding-Based Vertical Plane Beam Control for LTE-Advanced Systems

Kenji Hoshino, Sho Nabatame, Atsushi Nagate, Teruya Fujii, Softbank Mobile Corp.

3 On Minimizing the Maximum Broadcast Decoding Delay for Instantly Decodable Network Coding

Ahmed Douik, Sameh Sorour, Mohamed-Slim Alouini, Tareq Al-Naffouri, King Abdullah University of Science and Technology (KAUST)

4 Adaptive ABS Configuration Scheme with Joint Power Control for Macro-Pico Heterogeneous Networks

Hao Zhou, Hailun Xia, Caili Guo, Rui Han, Yaguang Wu, Beijing University of Posts and Telecommunications

5 Coordinated Multicell Precoding for Weighted Sum Rate Maximization with Per-Cell EE Constraints

Shiwen He, University of Southeast; Yongming Huang, Jiaheng Wang, Haiming Wang, Shi Jin, Luxi Yang, Southeast University

Tuesday, 16 September 2014 13:30-15:00 Cowichan

5A: Multimedia Service Provisioning in Mobile Networks

Chair: Kejun Tong

1 A Novel Strategy to Evaluate QoE for Video Service Delivered over HTTP Adaptive Streaming

Xiaolin Deng, Liang Chen, Fei Wang, Zesong Fei, Beijing Institute of Technology; Bai Wei, Chen Chi, Lei Wan, Guanglin Han, Huawei Technologies

2 Distributed Realcast: A Channel-Adaptive Video Broadcast Delivery Scheme

Guanhong Lai, Yu Liu, Zhang Lin, Beijing University of Posts and Telecommunications

3 Video Streaming for Highway VANET Using Scalable Video Coding

Ruijian An, Zhi Liu, Yusheng Ji, National Institute of Informatics, The Graduate University for Advanced Studies

Tuesday, 16 September 2014 10:30-12:00 Fraser

4H: Coding & Decoding

Chair: Mohammad Javad Abdoli

1 Analysis of Decoding Failures of DVB-S2 LDPC Codes

Jean-Christophe Sibel, Matthieu Crussière, Jean-François Héliard, Institute of Electronics and Telecommunications of Rennes

2 Trellis Decoding for Multi-User Faster-Than-Nyquist Transmission

Mohammad Javad Abdoli, Ming Jia, Huawei Technologies Canada Co., Ltd.

3 TTCM-Assisted Distributed Source-Channel Coding for Nakagami-m Fading Channels

Abdulah Aljohani, Soon Xin Ng, Lajos Hanzo, University of Southampton

4 MAP Decoding of Correlated Sources over Soft-Decision Orthogonal Multiple Access Fading Channels with Memory

Seyed Parsa Beheshti, Fady Alajaji, Tamás Linder, Queen's University-Kingston

5 On Optimized Uniform Quantization for SC Decoder of Polar Codes

Zhengming Shi, Kai Chen, Kai Niu, Beijing University of Posts and Telecommunications

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4I: Power Control

Chair: Kenichi Higuchi

1 Joint Control of Autonomous Cell Association and Power Control for Heterogeneous Networks with Inter-cell Interference Coordination

Kota Ito, Kenichi Higuchi, Tokyo University of Science

2 Transmission Power Control Method Using Protected and Non-protected Bands Based on Shared Metric Among Base Stations for Downlink Heterogeneous Networks

Soya Matsui, Kenichi Higuchi, Tokyo University of Science

3 Game Theory Based Uplink Power Control for UL/DL Split Scenario in Small Cell Networks

Rui Gao, Xiaodong Xu, Rao Zhang, Jin Xu, YuSun, Beijing University of Posts and Telecommunications

4 Downlink Power Control for Dense Small Cell Deployment in LTE-Advanced

Mingju Li, Liu Liu, Huiling Jiang, DOCOMO Beijing Communications Laboratories Co., Ltd

5 Joint Coloring-based Resource Allocation and Power Reduction in Dense Small Cell Networks

Shie Wu, Xia Hailun, Zhimin Zeng, Rui Han, Xi Chen, WenQi Zuo, Beijing University of Posts and Telecommunications

4 Optimization of fairness for HTTP adaptive streaming with network assistance in LTE mobile systems

Wang Min, Hans Hannu, Jonas Pettersson, Ylva Timmer, Ericsson

5 QoE-based Scheduling for Mobile Cloud Services via Stochastic Learning

Xiaoli Zhang, Kan Zheng, Jiadi Chen, Yue Li, Beijing University of Posts and Telecommunications

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5B: Relay Networks

Chair: Joseph H. Kang

1 Opportunistic Relays in 802.11 networks

Nicolas Montavont, Lucien Loiseau, Xavier Lagrange, Telecom Bretagne

2 Full-Duplex Relaying in an Infrastructure-based Wireless Network

Shu Luo, Pei Liu, Shivendra S. Panwar, Polytechnic University

3 Base Station Cooperation with Non-Ideal Backhaul and Non-Full Buffer Traffic

Krishna Balachandran, Joseph H. Kang, Kemal Karakayal, Kiran Rege, Bell Labs, Alcatel-Lucent

4 Trade-offs on Energy-Efficient Relay Deployment in Cellular Networks

Fanny Parzysz, Ecole de Technologie Supérieure; Mai Vu, Tufts University; François Gagnon, Ecole de Technologie Supérieure

5 Distributed Power Control and Beamforming in Multiuser Relay Network

Ruixue Hu, Lok Tat-Ming, The Chinese University of Hong Kong

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5C: MIMO Systems II

Chair: Serguei Primak

1 A Low-Complexity PTS Scheme for PAPR Reduction in SFBC MIMO-OFDM Systems

Sheng-Ju Ku, Tatung University

2 Filter Bank Multicarrier for Massive MIMO

Arman Farhang, Nicola Marchetti, Linda Doyle, Trinity College Dublin; Behrouz Farhang-Boroujeny, University of Utah

3 Compression of Channel State Information in Downlink MIMO-OFDM Systems

Yong-Ping Zhang, Huawei Technologies; Peng Wang, The University of Sydney; Xuesong Wang, Shulan Feng, Philipp Zhang, Huawei Technologies Co., Ltd.

4 CSI Reference Signal Multiplexing Using Carrier Frequency Swapping for FDD High-Order MIMO SDM

Mamoru Sawahashi, Tokyo City University; Teruo Kawamura, Yuichi Kakishima, NTT DOCOMO, INC.

5 Iterative Genetic and Greedy-Based Algorithms for Multi-Carrier Multi-User Scheduling in MIMO Systems with Successive Zero Forcing

Umut Ugurlu, Risto Wichman, Aalto University; Cássio Ribeiro, Carl Wijting, Nokia

Tuesday, 16 September 2014 13:30-15:00 Oak 2

5D: Wireless Sensor and Cognitive Networks

Chair: Steffen Beyme

1 Extensive Traffic Light Prediction under Real-World Conditions

Valentin Protschky, Stefan Feit, BMW Group; Claudia Linnhoff-Popien, LMU Munich

2 Sensing in Mobile Sensor Networks with Noisy Mobility Knowledge

Waleed Alasmary, Shahrokh Valaee, University of Toronto

3 Maximum-Likelihood Shadow-Matching

Deric Waters, Texas Instruments

4 Rollout Algorithm for Target Search in a Wireless Sensor Network

Steffen Beyme, Cyril Leung, The University of British Columbia

5 Performance Analysis for RUB-based Cognitive Radio Network with Cooperative Beam Selection

Tianqing Wu, Hong-Chuan Yang, University of Victoria

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5E: Channels & Models II

Chair: David Matolak

1 Measurements and Modeling of Cross-Correlation Property of Shadow Fading in High-Speed Railways

Bei Zhang, University of Beijing Jiaotong; Zhangdui Zhong, Beijing Jiaotong University; Ai bo, Tsinghua University; Dongping Yao, Ruisi He, University of Beijing Jiaotong

2 Measurement and Modeling of the LTE Train-Ground Channel for High-Speed Railway in Viaduct Scenario

Zhao Ruojun, Wu Muqing, Xiang Xiao, Yang Jiaqi, Beijing University of Posts and Telecommunications

3 Evaluation of Empirical Ray-Tracing Model for an Urban Outdoor Scenario at 73 GHz E-Band

Huan Cong Nguyen, Aalborg University; George R. MacCartney Jr., New York University; Timothy Thomas, Nokia Networks; Theodore Rappaport, New York University; Benny Vejlggaard, Nokia Networks; Preben E. Mogensen, Aalborg University

4 Cluster Power Variation Estimation for MIMO Channel Modeling in Crowded Indoor Environment

Kentaro Saito, Tetsuro Imai, Koshiro Kitao, Yukihiko Okumura, NTT DOCOMO, Inc.

5 2 GHz Band MIMO Channel Properties in Urban Small Cell Scenario in Crowded Area

Kentaro Saito, Tetsuro Imai, Yukihiko Okumura, NTT DOCOMO, Inc.

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5F: Multimedia Transmission and VANET

Chair: Luca Foschini

1 Multimedia Transmission for Emergency Services in VANETs

Muhammad Awais Javed, Duy T. Ngo, Jamil Khan, The University of Newcastle, Australia

2 Enhancing Vehicular Safety in Adverse Weather using Computer Vision Analysis

Che-Tsung Lin, Long-Tai Chen, ITRI; Yu-Chen Lin, Feng Chia University; Yuan-Fang Wang, UCSB

3 Cars Talk to Phones: A DSRC Based Vehicle-Pedestrian Safety System

Radovan Miucic, Honda R&D; Xinzhou Wu, Qualcomm Research

4 Road-Sign Text Recognition Architecture for Intelligent Transportation Systems

Abdelhamid Mammeri, El-Hebri Khiari, Azzedine Boukerche, University of Ottawa

5 Feedback-Free Non-Cooperative Power Control Game for Vehicular Ad Hoc Networks

Oliver Yu, Emir Saric, University of Illinois at Chicago

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5G: Wireless Communications

Chair: Jinho Choi

1 Max-Min Fair Resource Allocation for Min-Rate Guaranteed Services in Distributed Antenna Systems

Xiuhua Li, Xin Ge, University of British Columbia; Feng Li, Zhejiang University of Technology; Victor C. M. Leung, The University of British Columbia

2 MBMS Radio Resource Optimization by Tabu Search

Qing Xu, Université de technologie Belfort-Montbéliard; Hakim Mabed, Université de Franche-Comté; Frederic Lassabe, Alexandre Caminada, Université de Technologie Belfort-Montbéliard

3 On the decomposition method for distributed downlink beamforming in multi-cell systems

Jinho Choi, Gwangju Institute of Science and Technology

4 On UL-DL Imbalance Mitigation for HSPA Heterogeneous Network

Liu Liu, Yongyu Chang, Rongqian Qin, Chi Zhang, Dacheng Yang, Beijing University of Posts and Telecommunications

5 Filter Optimization Aided Interference Management with Improved Secrecy

Guido Dartmann, Volker Luecken, RWTH Aachen University; Özge Cepheli, Gunes Kurt, Istanbul Technical University; Gerd Ascheid, RWTH Aachen University

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5H: Modulation

Chair: Rui Dinis

1 Adaptive Polarization Modulation in Depolarization Channel with Polarization Dependent Loss

Guangwei Yang, Fangfang Liu, Zhimin Zeng, Chunyan Feng, Wen Zhao, Beijing University of Posts and Telecommunications

- 2 Adaptive Soft-Decision Aided Differential Modulation for Cooperative Uplink Transmission Relying on Radio-Over-Fiber Backhaul**
Dandan Liang, University of Surrey; Varghese A Thomas, Xinyi Xu, Soon Xin Ng, Mohammed El-Hajjar, Lajos Hanzo, University of Southampton
- 3 Magnitude Modulation applied to LINC transmitters: Paving the Road for Better Efficiency**
António Simões, Marco Gomes, Vitor Silva, Instituto de Telecomunicações - University of Coimbra; Rui Dinis, Universidade Nova de Lisboa; Francisco Cercas, Instituto de Telecomunicações
- 4 High Order Modulation in Faster-than-Nyquist Signaling Communication Systems**
Jungpil Yu, Joosung Park, Samsung Electronics; Fredrik Rusek, Lund University; Boris Kudryashov, Irina Bocharova, St.-Petersburg University
- 5 A Hierarchical Modulation and Network Coding-Assisted BICM System for Asymmetric Two Way Relay Channels**
Selvakumar Tharranetharan, Md. Jahangir Hossain, University of British Columbia

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6A: Information Distribution Services

Chair: Luca Foschini

- 1 Vehicles as Big Data Carriers: Road map space reduction and efficient data assignment**
Benjamin Baron, UPMC Sorbonnes Universités; Prométhée Spathis, UPMC Sorbonne Universités; Hervé Rivano, INSA Lyon, INRIA; Marcelo Amorim, Université Pierre et Marie Curie - Paris VI
- 2 Evolution for Mobile Contents Delivery Optimization**
Jicheol Lee, Hyungho Lee, Kyoungmo Park, Samsung Electronics; Jongmin Lee, SK Telecom
- 3 Spreading Information in Mobile Wireless Networks**
Jinho Choi, Yonsei University; Seung Min Yu, Samsung Electronics; Seong-Lyun Kim, Yonsei University, Korea
- 4 Carrier-Grade Voice Over LTE: Advantages and Challenges**
Gurudutt Hosangadi, Anil Rao, Alcatel-Lucent; Roger Bartlett, Sprint Nextel Corporation; Matthew Schlesener, Sprint
- 5 Distributed Antenna Tx/Rx Diversity Using Sparse Channel Estimation in Doubly Selective Nakagami-Rice Fading Channel**
Jimmy Hadi Susanto, Hiroyuki Miyazaki, Katsuhiko Temma, Fumiyuki Adachi, Tohoku University

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6B: LTE-A & 5G Networks

Chair: Jinho Choi

- 1 Enhanced Symbol-Level Interference Cancellation for PDCCH of 3GPP LTE/LTE-A**
Gregory Morozov, Intel; Alexei Davydov, Intel Corporation
- 2 Improving LTE/LTE-A UE Power Efficiency with Extended DRX Cycle**
Sangbum Kim, Samsung electronics; Kyunghun Jung, Samsung Electronics; Jongsoo Choi, Samsung Electronics Research Institute
- 3 Performance Evaluation of D2D Discovery with eNB Based Power Control in LTE-Advanced**
Yongjun Kwak, Sangmin Ro, Samsung Electronics Co., Ltd.; Younsun Kim, Samsung; Juho Lee, Samsung Electronics
- 4 An Access Priority Level Based Random Access Scheme for QoS Guarantee in TD-LTE-A Systems**
Xinsheng Zhao, Junhui Zhai, Geng Fang, Southeast University

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5I: Interference Channels

Chair: Per Zetterberg

- 1 Distributed Joint Transmitter-Receiver Beamforming and Power Allocation in MIMO Interference Channel with Interference Alignment**
Mengjie Xie, Lok Tat-Ming, The Chinese University of Hong Kong
- 2 Interference Alignment (IA) and Coordinated Multi-Point (CoMP) overheads and RF impairments: testbed results**
Per Zetterberg, KTH Stockholm
- 3 Resource Allocation Strategy in Multiple Access Interference Channel**
Swagato Barman Roy, A.S. Madhukumar, Nanyang Technological University
- 4 Sum Rate Analysis of Multicell MU-MIMO with 3D User Distribution and Base Station Tilting**
Xie Ling, Li LiHua, Li Xingwang, BUPT
- 5 Adaptive SU/MU-MIMO Scheduling for LTE-A Downlink Cellular Networks**
Wei Guo, Xi'an Jiaotong University; Jiancun Fan, Xi'an Jiaotong University; Geoffrey Y. Li, Georgia Tech; Qinye Yin, Xi'an Jiaotong University; Xiaolong Zhu, Huawei Shanghai Research Institute

5 The Potential of Flexible UL/DL Slot Assignment in 5G Systems

Davide Catania, Marta Gatnau, Gilberto Berardinelli, Aalborg University; Andrea Fabio Cattoni, Aalborg Universitet; Frank Frederiksen, Nokia Networks; Preben E. Mogensen, Aalborg University

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6C: Smart Grid, Electric Vehicles and Vehicular Electronics

Chair: Hamed Mohsenian-Rad

- 1 A QoS Scheme for Charging Electric Vehicles in a Smart Grid Environment**
Irfan Al-Anbagi, Hussein T. Mouftah, University of Ottawa
- 2 Developing a Test Data Set for Electric Vehicle Applications in Smart Grid Research**
Hossein, Hamed Mohsenian-Rad, University of California at Riverside; Ali Nejat, Texas Tech University
- 3 Energy management algorithms comparison for an electric bus with an hybrid energy storage system by means of Dynamic Programming**
Davide Tarsitano, Laura Mazzola, Stefano Arrigoni, Ferdinando Mapelli, Federico Cheli, Politecnico di Milano
- 4 Sky-Hook Control for a Regenerative Suspension System**
Chen-Yu Hsieh, Bo Huang, Simon Fraser University

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6D: Cognitive Radio & M2M

Chair: Roger Cheng

- 1 A Novel Multi-bit Decision Adaptive Cooperative Spectrum Sensing Algorithm Based on Trust Valuations in Cognitive OFDM System**
Min Jia, Xinyu Wang, Guo Qing, Xuemai Gu, Harbin Institute of Technology
- 2 Wide-Band Cooperative Compressive Spectrum Sensing for Cognitive Radio Systems Using Distributed Sensing Matrix**
Mohammed Farrag, Assiut University; Osamu Muta, Kyushu University; Mostafa El-Khany, Alexandria University; Hiroshi Furukawa, Kyushu University; Mohamed El-Sharkawy, Egypt-Japan University of Science and Technology (E-JUST)

3 Hybrid-Optimization-Based Power Allocation for Cognitive Relay Transmission

Feng Li, Zhejiang University of Technology; Min Jia, Harbin Institute of Technology; Xiuhua Li, University of British Columbia; Li Wang, Zhejiang University of Technology

4 Cross-Device Signaling Channel for Cellular Machine-Type Services

Chan Zhou, Huawei European Research Center; Egon Schulz, Huawei Technologies Duesseldorf GmbH

5 Distributed Charging Control of Plug-in Electric Vehicles via the Stochastic Alternating Direction Method of Multipliers

Shibo Chen, Roger S. Cheng, Hong Kong University of Science and Technology

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6E: Channels & Models III

Chair: Alenka Zajic

1 System Level Assessment of Vehicular MIMO Antennas in 4G LTE Live Networks

Levent Ekiz, BMW Research and Technology; Adrian Posselt, BMW Group Research and Technology; Oliver Klemp, BMW Forschung und Technik GmbH; Christoph F. Mecklenbräuker, Technische Universität Wien

2 Path Loss Models in NLOS Conditions for Relay Mobile Channels

Issam MAAZ, Telecom ParisTech; Jean-Marc Conrat, Orange Labs; Jean-Christophe Cousin, Communications and Electronics Department, TELECOM ParisTech, France

3 Study on Characteristics of Human Body Shadowing in High Frequency Bands

Ngochao Tran, Tetsuro Imai, Yukihiro Okumura, NTT DOCOMO, Inc.

4 Propagation Prediction for LTE Small Cells with Antenna Beam Tilt

Jihoon Choi, Korea Aerospace University; Hyukjun Oh, Kwangwoon University; Hyun-Cheol Jeon, SK Telecom

5 Radio Propagation into Modern Buildings: Attenuation Measurements in the Range from 800 MHz to 18 GHz

Ignacio Rodriguez, Huan Cong Nguyen, Niels Terp Kjeldgaard Jørgensen, Troels B. Sørensen, Aalborg University; P. E. Mogensen, Nokia Networks

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6F: VANET

Chair: Luca Bedogni

1 Performance Analysis of Connectivity for Vehicular Ad Hoc Networks with Moving Obstructions

Ruifeng Chen, Zhangdui Zhong, Beijing Jiaotong University; Victor C. M. Leung, David Michelson, The University of British Columbia

2 Proper Handover Between VANET and Cellular Network Improves Internet Access

Shumin Bi, Cailian Chen, Rong Du, Xinpeng Guan, Shanghai Jiao Tong University

3 Resource Allocation Schemes for D2D Communication used in VANETs

Weijun Xing, Ning Wang, Chao Wang, University of Tongji; Yusheng Ji, National Institute of Informatics; Fuqiang Liu, University of Tongji

4 Quality-Driven Adaptive Video Streaming for Cognitive VANETs

Long Sun, Aiping Huang, Hangguan Shan, Zhejiang University; Min Xing, Lin Cai, University of Victoria

5 Dynamic Overlay-based Scheme for Video Delivery over VANETs

Yun Chen, Xuelian Cai, Mingyu Gao, Xin Wang, Lina Zhu, Xidian University

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6G: Two-way Relaying Transmissions

Chair: Kang Song

1 Performance Analysis of Antenna Selection in Two-Way Decode-and-Forward Relay Networks

Kang Song, Baofeng Ji, Yongming Huang, Southeast University; Ming Xiao, Kungliga Tekniska Högskolan; Luxi Yang, Southeast University

2 Performance Analysis of Distributed Method for Two-Way Cooperative Relay Systems

Tarla Abadi, Khairi Hamdi, University of Manchester

3 Phase-Forward - A Robust Transmission Scheme for Two-way Cooperative Communication with Non-linear Power Amplifiers

Tan Huai, Paul Ho, Simon Fraser University

4 Multiuser Two-Way Filter-and-Forward Relaying for Ultra-Wideband Communications

Zahra Ahmadian, Jan Mietzner, Lutz Lampe, University of British Columbia

5 Joint time and frequency allocation for two-way relaying in LTE systems

Szu-Liang Wang, Tsan-Ming Wu, Chung Yuan Christian University

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6H: Receiver & Transceiver Techniques

Chair: Tim Halsig

1 Spectral Efficient Communications employing 1-Bit Quantization and Oversampling at the Receiver

Tim Halsig, Universität der Bundeswehr München; Lukas Landau, Gerhard Fettweis, Technische Universität Dresden

2 Receiver Design for SIMO-OFDM Systems with Insufficient Cyclic Prefix

Tri Minh Pham, Philippa A. Martin, Graeme Woodward, University of Canterbury; Krishna P. Kongara, Simoco Australasia Pty. Ltd.; Clive Horn, Tait Communications

3 Monostatic Airborne SAR Using License Exempt WiMAX Transceivers

Kai Liu, Xianbin Wang, Jagath Samarabandu, Auon Akhtar, University of Western Ontario

4 Robust Frequency-Domain Receivers for A Transmission Technique with Directivity at the Constellation Level

Paulo Carvalho, Rui Dinis, Daniel Marques, Universidade Nova de Lisboa

5 Linearization through Narrowband Feedback: Problems and Solutions

Alexander Lozhkin, Fujitsu Ltd.; Kazuo, Nagatani

6 Radio-over-Fiber Aided Base Station Coordination for OFDM

Ana Garcia-Armada, Universidad Carlos III de Madrid; Varghese A Thomas, Mohammed El-Hajjar, Lajos Hanzo, Southampton University

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6I: Spatial Modulation & Visible Light Communication

Chair: Marco Di Renzo

1 Spatially-Averaging Channel Estimation for Spatial Modulation

Xiping Wu, University of Edinburgh; Marco Di Renzo, CNRS-SUPELEC-Univ Paris-Sud; Harald Haas, University of Edinburgh

2 A High Spectral Efficiency Spatial Modulation Technique

Raed Mesleh, University of Tabuk; Salama Ikki, Lakehead University

3 3-Dimensional Shift Keying Modulation Schemes for High Rate MIMO Systems

Nan Wu, Xudong Wang, Hao Dai, Dalian Maritime University

4 Performance Analysis of Space Modulation Techniques over $\mathbb{S}\mathbb{S}$ Fading Channels with Imperfect Channel Estimation

Osamah Badarneh, University of Quebec-ETS; Raed Mesleh, Hadi M. Aggoune, University of Tabuk

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7A: Spectrum Sensing I

Chair: Woongsup Lee

1 **A Simplified Spectrum Sensing Scheme under Multiple Primary Transmit Power**

Qing Lv, Feifei Gao, Han Qian, Tsinghua University; Tao Jiang, Huazhong University of Science and Technology, Wuhan

2 **An Efficient Cooperative Spectrum Sensing Under Bandwidth Constraint with User Selection**

Quoc-Tuan Vien, Huan X. Nguyen, Orhan Gemikonakli, Balbir Barn, Middlesex University

3 **Cluster-Based Cooperative Spectrum Sensing Assignment Strategy in Cognitive Radio Networks**

Wenjie Zhang, Yiqun Yang, A/P Chai Kiat Yeo, Nanyang Technological University; Lei Deng, The Chinese University of Hong Kong

4 **Cooperative Spectrum Sensing in a Medium-traffic Primary Network using Double-threshold Scheme over Imperfect Reporting Channels**

Ramtin Rabiee, Kwok Hung Li, Nanyang Technological University

5 **Robust Spectrum Sensing with Crowd Sensors**

Guoru Ding, Fei Song, Qihui Wu, PLA University of Science and Technology; Yulong Zou, McGill University; Linyuan Zhang, Shuo Feng, Jinlong Wang, PLA University of Science and Technology

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7B: LTE Networks

Chair: Witold Krzymien

1 **A Combined PUSH/PULL Service Discovery Model for LTE Direct**

Gwenael Poitou, Ultra Electronics TCS; Benoit Pelletier, Ghyslain Pelletier, Diana Pani, InterDigital Canada

2 **Design of a D2D overlay for next generation LTE**

Philippe Sartori, Huawei Technologies; Vip Desai, Hossein Bagheri, Brian Classon, Deping Liu, Huawei; Anthony C. K. Soong, Huawei Technological Co. Ltd; Mazin Shalash, Huawei Technologies. Co., Ltd.

3 **Expanding Coverage Range and Control Channel Capacity of Co-Channel LTE Small Cells by Using PDCCH Orthogonalization**

Stepan Kucera, David Lopez, Bell Labs Alcatel-Lucent

4 **Optimized LTE Cell Planning for Multiple User Density Subareas using Meta-Heuristic Algorithms**

Hakim Ghazzai, KAUST; Elias Yaacoub, Qatar Mobility Innovations Center (QMIC); Mohamed-Slim Alouini, KAUST

5 **Robust Adaptive Modulation and Coding (AMC) Selection in LTE Systems using Reinforcement Learning**

Raffaele Bruno, Antonino Masaracchia, Andrea Passarella, IIT-CNR

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7C: Cognitive Radio & D2D Communication

Chair: Zhengguo Sheng

1 **Cooperation-based Network Coding in Cognitive Radio Networks**

Nan Li, Ming Xiao, Lars Rasmussen, KTH Royal Institute of Technology

2 **Wireless Energy Harvesting and Spectrum Sharing in Cognitive Radio**

S. Ali Mousavifar, Cyril Leung, The University of British Columbia; Yuanwei Liu, Maged Elkashlan, Queen Mary University of London; Trung Q. Duong, Queen's University Belfast

3 **Introduction of an Efficiency Metric for Device-to-Device Communication in Cellular Networks**

Markus Klügel, Wolfgang Kellerer, Technische Universität München

4 **On the hopping pattern design for D2D Discovery**

Qizhi Zhang, Deping Liu, Huawei Technologies Co. Ltd.

5 **Intra-Cluster Device-to-Device Multicast Algorithm Based on Small World Model**

Nannan Chen, Tian Hui, Zhibo Wang, Li Jiang, Beijing University of Posts and Telecommunications

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7D: Relay & Cooperative Systems

Chair: Tomoaki Ohtsuki

1 **Analytical Evaluation of Nonlinear Amplify-and-Forward Relay Systems for OFDM Signals**

João Guerreiro, FCT-UNL; Rui Dinis, Universidade Nova de Lisboa; Paulo Carvalho, FCT- Universidade Nova de Lisboa

2 **Relay Channel with Causal Channel State Information**

Dajin Wang, Samsung Electronics

3 **Outage Probability of Amplify-and-Forward Relay Networks Employing Maximum Ratio Combining and Transmit Antenna Selection in Heterogeneous Channels**

Zubeir Bocus, Toshiba Research Europe Ltd.; Justin Coon, Oxford University; Stephen Wang, Toshiba Research Europe

4 **Coordinated Adaptive Control in Device-to-Device Communications Based on Delayed Limited Feedback**

Fengfeng Shi, Southeast University; Wei Xu, Southeast University, Nanjing; Hong Shen, Chunming Zhao, Southeast University

5 **Performance of Spectrum Sharing Protocol for Uplink Transmissions in Cellular Communications with Relays**

Dileep Kumar Verma, Indian Institute of Technology, Delhi; Shankar Prakriya, IIT Delhi

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7E: Energy-efficient Resource Allocation

Chair: Hong Yang

1 **Resource Allocation for OFDMA Systems with Selective Relaying and Energy Harvesting**

Roya Arab Loodaricheh, Shankanaad Mallick, Vijay K. Bhargava, University of British Columbia

2 **Utility based Energy-efficient Resource Allocation Algorithm in OFDM System**

Ningyu Chen, Pengxiang Hu, Tao Xiaofeng, Cui Qimei, Beijing University of Posts and Telecommunications

3 **An Energy-efficient Non-cooperative Game Approach for Channel-aware Distributed Medium Access Control**

Yuanshuang Wang, Xi'an Jiaotong University; Guowang Miao, KTH, Royal Institute of Technology; Xia Wang, Xi'an Jiaotong University

4 **Efficient Power Control via Non-Cooperative Target SINR Competition in Distributed Wireless Networks**

Xiao Tang, Pinyi Ren, Yichen Wang, Qinghe Du, Li Sun, Xi'an Jiaotong University

5 **Energy Efficient Power and Subchannel Allocation in Dense OFDMA Small Cell Networks**

Meng Wang, Tian Hui, Gaofeng Nie, Beijing University of Posts and Communications

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7F: Performance Evaluation II

Chair: Hans-Jürgen Zepernick

- 1 LTE 700 MHz: Evaluation of the Probability of Interference to Digital TV**
Fabiano Chaves, Instituto Nokia de Tecnologia; Rauno Ruismaki, Nokia Corporation
- 2 Performance Analysis of Interference Penalty Algorithm for LTE Uplink in Heterogeneous Networks**
Moushumi Sen, Suresh Kalyanasundaram, Rajeev Agrawal, Hans Kroener, Nokia Networks
- 3 Impact of Directional Receiving Antennas on the Performance and Quality of Service of Wireless Networks**
Jean-Marc Kelif, Olivier Simon, Orange Labs
- 4 Current Consumption Measurements with a Carrier Aggregation Smartphone**
Rafael Sanchez-Mejias, Nokia Networks; Mads Lauridsen, Aalborg University; Yu Guo, Luis Ángel Maestro Ruiz de Temiño, Nokia Networks; Preben E. Mogensen, Aalborg University
- 5 Comparison Analysis of Outdoor Channel Characteristics at 28 GHz and 2 GHz Using 3D Ray-Tracing Technique**
Sangkyu Baek, Youngbin Chang, Hyunjin Kim, Anil Agiwal, Samsung Electronics

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7G: Synchronziation & Equalization

Chair: Li-Nan Lee

- 1 Frequency-Domain Response Based Timing Synchronization: A Near Optimal Sampling Phase Criterion for TDS-OFDM**
Zhen Gao, Chao Zhang, Yu Zhang, Tsinghua University
- 2 Modulation, Coding, and Synchronization for Mobile and Small Satellite Terminals: an Update of the DVB-S2 Standard**
Lin-Nan Lee, Mustafa Eroz, Neal Becker, Hughes Network Systems
- 3 Non-Data Aided Frequency Synchronization exploiting ICI in Non-Orthogonal Systems**
Tobias Kadur, Ivan Simões Gaspar, Nicola Michailow, Gerhard Fettweis, Technische Universität Dresden
- 4 Joint Equalization and Phase Drift Compensation for the Underwater Acoustic Channel**
Pedro Pedrosa, Instituto de Telecomunicações; Rui Dimis, Universidade Nova de Lisboa; Fernando Nunes, Instituto Superior Técnico
- 5 Pseudo Block Coded Single-Carrier Frequency-Domain Equalization Transmission**
Hiroyuki Miyazaki, Fumiyuki Adachi, Tohoku University

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8A: Spectrum Sensing II

Chair: Woongsup Lee

- 1 A Novel Sequential Spectrum Sensing Method via Stochastic Resonance**
Rui Gao, Xidian University; Zan Li, State Key Laboratory of ISN, Xidian University; Peihan Qi, Xidian University
- 2 Full-duplex Spectrum Sensing Scheme Based on Phase Difference**
Jian Yang, Beijing University of Posts and Telecommunications; Ying Zhu, Guilin University of Electronic Technology; Ishtiaq Ahmad, Mingfei Gao, Xiao Yan, Yifan Zhang, FENG Zhiyong, Beijing University of Posts and Telecommunications
- 3 Improved Energy Detector for Full Duplex Sensing**
Xiao Yan, Ishtiaq Ahmad, Mingfei Gao, Jian Yang, Yuchi Zhang, Zhiyong Feng, Yifan Zhang, Beijing University of Posts and Telecommunications

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7H: Antenna Propagation & Channel Measurement

Chair: Kezhi Wang

- 1 Performance Analysis of Amplify-and-Forward Dual-Hop Mixed RF/FSO Systems**
Sanya Anees, I.I.T. Delhi; Manav R Bhatnagar, IIT Delhi
- 2 Pilot Power Optimization for AF Relaying Using Maximum Likelihood Channel Estimation**
Kezhi Wang, Yunfei Chen, University of Warwick; Mohamed-Slim Alouini, KAUST; Feng Xu, Hohai University
- 3 Sum of Ratios of Products for α - μ Random Variables in Wireless Multihop Relaying and Multiple Scattering**
Kezhi Wang, University of Warwick; Tian Wang, King Abdullah University of Science and Technology; Yunfei Chen, University of Warwick; Mohamed-Slim Alouini, KAUST
- 4 Resource Allocation for Two-Users DF-OFDMA Systems**
Hanan Al Tous, Imad Barhumi, UAE University
- 5 Outage Performance of Incremental Relaying Networks with OFDM Subcarriers Mapping Schemes**
Ala Gousssem, Mazen O. Hasna, Ridha Hamila, Qatar University

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7I: Network Coding & Physical Layer Security

Chair: Roger Cheng

- 1 On-the-fly Overlapping of Sparse Generations: A Tunable Sparse Network Coding Perspective**
Chres Wiant Sørensen, Daniel Lucani, Frank H.P. Fitzek, Aalborg University; Muriel Médard, Massachusetts Institute of Technology
- 2 Sub-Transport Layer Coding: A Simple Network Coding Shim for IP Traffic**
Jonas Hansen, Jeppe Krigslund, Daniel Lucani, Frank H.P. Fitzek, Aalborg University
- 3 Secrecy Outage Analysis of Transmit Antenna Selection with Switch-and-Examine Combining over Rayleigh Fading**
Hu Yujia, Beijing University of Posts and Telecommunications
- 4 Secret Key Generation Using Physical Channels with Imperfect CSI**
Serguei Primak, Xianbin Wang, Kang Liu, University of Western Ontario
- 5 Asymptotic Analysis of Average Secrecy Capacity Under Transmit Antenna Selection for the MIMO Wiretap Channel**
Nayeema Sadeque, Ingmar Land, Ramanan Subramanian, University of South Australia

4 Spectrum Sensing Based on EDCAF of Signal in Multipath-doppler Channel

Meimei Duan, Zhimin Zeng, Caili Guo, Beijing University of Posts and Telecommunications

5 Advanced Spectrum Sensing for OFDM-based Cognitive Radio Networks Using Cyclic Prefix

Wen-Long Chin, Chun Wei, Trong Nghia Le, National Cheng Kung University

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8B: LTE & Future Generation Communications

Chair: Long Le

- 1 LTE Wireless Network Virtualization: Dynamic Slicing via Flexible Scheduling**
Mahmoud Kamel, Long, Le, INRS, University of Quebec; Andre Girard, GERAD

- 2 **EXIT-Chart Aided Code Design for Symbol-Based Entanglement-Assisted Classical Communication over Quantum Channels**
Zunaira Babar, Soon Xin Ng, Lajos Hanzo, University of Southampton
- 3 **On the Potential of Zero-tail DFT-spread-OFDM in 5G Networks**
Gilberto Berardinelli, Fernando Tavares, Troels B. Sørensen, Aalborg University; Preben E. Mogensen, Kari Pajukoski, Nokia Networks
- 4 **HARQ Signalling Design for Dynamic TDD System**
Chunyi Wang, Xiaolin Hou, Huiling Jiang, DOCOMO Beijing Communications Laboratories Co., Ltd
- 5 **Physical Layer Performance Comparison of LTE and IEEE 802.11p for Vehicular Communication in an Urban NLOS Scenario**
Andreas Möller, Jörg Nuckelt, Dennis M. Rose, Thomas Kürner, Technische Universität Braunschweig

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8C: Resource Allocation

Chair: Quoc-Tuan Vien

- 1 **Resource allocation for Device-to-Device communication in LTE-A network: A Stackelberg game approach**
Chunmei Xia, Shaoyi Xu, Beijing Jiaotong University; Kyungsup Kwak, Inha University
- 2 **Dynamic Resource Allocation in OFDMA Uplink for MAI Mitigation and Throughput Improvement**
Hieu Le, Arash Behboodi, Adam Wolisz, Technical University of Berlin
- 3 **QoS-Aware User Association for Load Balancing in Heterogeneous Cellular Networks**
Tianqing Zhou, Yongming Huang, Wei Huang, Shidang Li, Shidang Li, Luxi Yang, Southeast University
- 4 **Analysis of Practical Frequency Selective Scheduling Algorithms in LTE Networks**
Faris Alfarhan, Regis Lerbour, Yann Le Helloco, Gregory Donnard, InfoVista
- 5 **Performance Analysis of Dynamic Spectrum Leasing Strategies in Overlay Cognitive Radio Networks**
Mario A. Ramirez-Reyna, CINVESTAV; Felipe A. Cruz-Pérez, CINVESTAV-IPN; Mario E. Rivero-Angel, UPIITA-IPN; Genaro Hernandez-Valdez, Universidad Autonoma Metropolitana

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8D: Vehicular Communications

Chair: Yasushi Yamao

- 1 **QoE-aware Routing for Video Streaming over VANETs**
Pham Tran Anh Quang, IRISA / University of Rennes 1; Kandaraj Piamrat, CReSTIC, University of Reims Champagne-Ardenne; Cesar Viho, IRISA
- 2 **Improving Performance of Packet Combining Relay for ITS V2V Communication**
Le Tien Tien, Yasushi Yamao, University of Electro-Communications
- 3 **Legislative Particularities in the Russian Federation of the Radio Spectrum Allocation for Radio Electronic Equipment built in Vehicles**
Igor Khvorov, Vladimir Grigoryev, University ITMO; Vladimir Vlasov, State Technical University - MADI; Elena Grigoreva, Technische Universität München
- 4 **Toward an Open Source Location Privacy Evaluation Framework for Vehicular Networks**
David Eckhoff, Mykola Protsenko, Reinhard German, University of Erlangen
- 5 **A Computationally Inexpensive Battery Model for the Microscopic Simulation of Electric Vehicles**
Sebastian Schellenberg, Ruediger Berndt, David Eckhoff, Reinhard German, University of Erlangen

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8E: Green Cellular Networks

Chair: Kai Yang

- 1 **Energy Saving Enhancement for LTE-Advanced Heterogeneous Networks with Dual Connectivity**
Athul Prasad, NEC Europe Ltd.; Andreas Maeder, NEC Laboratories Europe
- 2 **Energy-Efficient Resource Allocation for Downlink in LTE Heterogeneous Networks**
Kai Yang, Steven Martin, Yahiya, Université Paris-Sud; Jinsong Wu, Bell Laboratories
- 3 **Joint Interference Mitigation and Power Allocation for Multi-cell LTE Networks: A Non-cooperative Game Approach**
Yuanshuang Wang, Xi'an Jiaotong University; Guowang Miao, KTH, Royal Institute of Technology; Xia Wang, Xi'an Jiaotong University
- 4 **Multi-Operator Collaboration for Green Cellular Networks under Roaming Price Consideration**
Hakim Ghazzai, KAUST; Elias Yaacoub, Qatar Mobility Innovations Center (QMIC); Mohamed-Slim Alouini, KAUST
- 5 **An Energy Efficient Implementation of C-RAN in HetNet**
Liming Chen, Harbin Institute of Technology; Hu Jin, The University of British Columbia; Haoming Li, Jun Bae Seo, University of British Columbia; Guo Qing, Harbin Institute of Technology; Victor C. M. Leung, The University of British Columbia

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8F: Networks Simulation

Chair: Abdelhamid Mammari,

- 1 **Similitude: Interfacing a traffic simulator and network simulator with emulated Android clients**
Seth N. Hetu, Massachusetts Institute of Technology; Vahid Saber Hamishagi, Singapore-MIT Alliance for Research and Technology; Li-Shiuan Peh, Massachusetts Institute of Technology
- 2 **Simulation of Contrasting Clustering Paradigms under an Experimentally-derived Channel Model**
Craig Cooper, Montserrat Ros, Farzad Safei, University of Wollongong; Daniel Franklin, Mehran Abolhasan, University of Technology Sydney
- 3 **Coordinated Ramp-Metering Control Using a Time-Gap Based Traffic Model**
Seokheon Cho, Rene Cruz, Ramesh Rao, University of California, San Diego
- 4 **Channel Modeling of Decode-and-Forward Relaying VANETs**
Bengi Aygun, Alexander M. Wyglinski, Worcester Polytechnic Institute
- 5 **Quasi-Full-Duplex Wireless Communication Scheme for High-Speed Railway**
Li Yan, Xuming Fang, Southwest Jiaotong University

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8G: Wireless LAN

Chair: Geoffrey Messier

- 1 **3G Femto or 802.11g WiFi: Which is the Best Indoor Data Solution Today?**
Niels Terp Kjeldgaard Jørgensen, Ignacio Rodriguez, Aalborg University; Jan Elling, Telenor Denmark; Preben E. Mogensen, Aalborg University
- 2 **Adaptive Transmit Power for Wi-Fi Dense Deployments**
Fabiano Chaves, André Mendes Cavalcante, Almeida, Fuad Mousse Abinader Junior, Robson. D. Vieira, Nokia Institute of Technology (INT); Sayantan Choudhury, Klaus Doppler, Nokia Research Center
- 3 **Performance Evaluation of IEEE 802.11n WLAN in Dense Deployment Scenarios**
Fuad Mousse Abinader Junior, Érika Almeida, André Mendes Cavalcante, Fabiano Chaves, Robson Vieira, Nokia Technology Institute; Sayantan Choudhury, Esa Tuomaala, Klaus Doppler, Nokia

Research Center; Vicente A. de Sousa Jr., UFRN - Federal University of Rio Grande do Norte

- 4 **CRC codes for short control frames in IEEE 802.11ah**
Li Chia Choo, Zander Lei, Institute for Infocomm Research
- 5 **Increasing the Capacity of Large-Scale HetNets through Centralized Dynamic Data Offloading**
Henrik Klessig, Michael Günzel, Gerhard Fettweis, Technische Universität Dresden

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8H: Cooperative Communications II

Chair: Nan Li

- 1 **In-vehicle mm-Wave Channel Model and Measurement**
Jiri Blumenstein, Tomas Mikulasek, Roman Marsalek, Ales Prokes, Brno University of Technology; Thomas Zemen, Forschungszentrum Telekommunikation Wien ftw.; Christoph F. Mecklenbräuer, Technische Universität Wien
- 2 **Performance Analysis of Micro Site with Tilted Antenna in a Realistic High Rise Building Scenario**
Liu Xiaomin, Yuancao Li, Beijing University of Posts and Telecommunications
- 3 **An Analytical 3D Ray-Launching Method Using Arbitrary Polygonal Shapes for Wireless Propagation Prediction**
Dennis M. Rose, Thomas Kürner, Technische Universität Braunschweig
- 4 **Experimental Validation of the OFDM Bit Error Probability for a Moving Receive Antenna**
Ronald Nissel, Martin Lerch, Markus Rupp, Vienna University of Technology

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9A: Green Communications

Chair: Christian Mannweiler

- 1 **Equilibrated Activating Strategy with Small Cell for Energy Saving in Heterogeneous Network**
Yexiao Qu, Yongyu Chang, Yang Sun, Dacheng Yang, Beijing University of Posts and Telecommunications
- 2 **Stability-aware and Energy Efficient Cell Management in Ultra Dense Networks**
Chan Zhou, Ömer Bulakci, Huawei European Research Center
- 3 **Optimal Real and Reactive Power Management for Residential Users in Smart Grid**
Shibo Chen, Roger S. Cheng, Hong Kong University of Science and Technology
- 4 **An Enhanced Power Control Scheme for Dual Connectivity**
Jin Liu, Jianguo Liu, Huan Sun, Alcatel-Lucent Shanghai Bell
- 5 **Evaluating the Energy Balance of Solar-Powered Coordinated Wireless Backhaul Networks**
Christian Mannweiler, German Research Center for Artificial Intelligence (DFKI); Hans Schotten, University of Kaiserslautern

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9B: Heterogeneous Wireless Networks

Chair: Long Bao Le

- 1 **Analysis of Carrier Deployment Strategies for LTE-A HetNets with Multicell Cooperation**
Hua Wang, Aalborg University; Claudio Rosa, Klaus Pedersen, Nokia Solutions and Networks
- 2 **Throughput Analysis and Design for Coexisting WLAN and ZigBee Network**
Phuong Luong, Tri Nguyen, Long, Le, INRS, University of Quebec
- 3 **Virtual Cells: Enhancing the Resource Allocation Efficiency for TD-LTE**
Konstantinos Samdanis, Rudraksh Shrivastava, Athul Prasad, Peter Rost, NEC Europe Labs; David Grace, University of York

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8I: MIMO Relaying Systems

Chair: Yuanyuan Chen

- 1 **A Virtual MIMO Relay System with Unmanned Aircraft and Multiple Ground Stations**
Kensuke Ikeda, Yokohama National University; Fumie Ono, NICT; Hideki Ochiai, Yokohama National University; Ryu Miura, NICT
- 2 **Joint Transceiver Optimization for MIMO Multiuser Relaying Networks with Channel Uncertainties**
Jiaxin Yang, Benoit Champagne, McGill University
- 3 **Time Domain Loop Interference Channel Estimation and Cancellation for Mobile MIMO Wireless Relays**
David Halls, Toshiba Research Europe Ltd; Tsuguhide Aoki, Noritaka Deguchi, Toshiba Corporation
- 4 **Performance of Cell Edge for Multi-cell MIMO Broadcast Channel**
Md. Hashem Ali Khan, Chonbuk National University; Kye Mun Cho, Chonbuk National University, Korea
- 5 **Impact of Path Loss on the Capacity of Large MIMO AF Relay Networks**
Yuanyuan Chen, Chen Liu, Youhua Fu, Hairong Wang, Nanjing University of Posts and Telecommunications; Wei-Ping Zhu, Concordia University

4 Dynamic Interference Mitigation in Two tier HetNets: Modeling and Analysis

Zeinab Yazdanshenasan, Mehrnaz Afshang, Peter Han Joo Chong, Nanyang Technological University

5 Multi-flow Transmission and Carrier Aggregation Inter-operation in HSPA+ Advanced

Ahlem Khlass, Telecom ParisTech; Salah Eddine Elayoubi, Thomas Bonald, Orange Labs

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9C: New Access Schemes in Cognitive Radio

Chair: Michael McGuire

- 1 **Cognitive Multiuser MIMO in Spectrum Sharing Environment with Antenna Correlation over Nakagami-m Fading**
Ahmed H. Abd El-Malek, King Fahd University of Petroleum and Metal; Fawaz Al-Qahtani, Texas A&M University at Qatar; Salam A. Zummo, King Fahd University of Petroleum and Metal; Hussein Alnuweiri, Texas A&M University at Qatar
- 2 **Experimental Testbed for Dynamic Spectrum Access and Sensing of 5G GFDM Waveforms**
Martin Danneberg, Rohit Datta, Gerhard Fettweis, Technische Universität Dresden
- 3 **Opportunistic Spectral Access in Cooperative Cognitive Radio Networks**
Wei Liang, Soon Xin Ng, University of Southampton; Siavsash Bayat, Yonghui Li, University of Sydney; Lajos Hanzo, University of Southampton
- 4 **Scaling Law of Multi-hop Cognitive Network with a Novel Hybrid Access Scheme**
Yuchi Zhang, Beijing University of Posts and Telecommunications
- 5 **Compress-and-Forward Based Strategy in Overlay Cognitive Radio Channel with Partial CSIT**
Jing Zhai, Wenbo Xu, Wenbo Guo, Kai Niu, Beijing University of Posts and Telecommunications

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9D: Precoder Design & Multiple Access

Chair: Mazen Omar O. A. Hasna

- 1 A Novel Precoder Design for MIMO Multicasting with MMSE-DFE Receivers**
Zilong Zhang, Xiaodong Xu, Baisheng Du, Zhiyong Chen, University of Science and Technology of China
- 2 On Achieving Optimal Rate of Digital Precoder by RF-Baseband Codedesign for MIMO Systems**
Edin Zhang, Chiachi Huang, Yuan Ze University
- 3 A Precoder Design for Two-Way Amplify-and-Forward MIMO Relay Systems with Linear Receivers**
Chin-Liang Wang, Jyun-Yu Chen, Jihh-Jhong Jheng, National Tsing Hua University
- 4 A Novel Joint Precoder and Receiver Design with Imperfect CSI for Multi-User MIMO Downlink**
Umut Ugurlu, Risto Wichman, Aalto University; risto.wichman@aalto.fi; Cássio Ribeiro, Nokia Research Center; Carl Wijting, Nokia
- 5 Equal-Priority Multiple Access Communications With Minimum Queuing Delay**
Moamen Soliman, Amr El-Keyi, Nile University; Ahmed Sultan, Alexandria University

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9E: Wireless Networks

Chair: Daniel C. Lee

- 1 Optimal Throughput-Distance Relationship in Multi-Relay Wireless Data Networks**
Bader Alkandari, Kaveh Pahlavan, Worcester Polytechnic Institute
- 2 A Cost Based Handoff Hysteresis Scheme in Wireless Mobile Relay Node**
Battulga Davaasambuu, Takuro Sato, Waseda University
- 3 Asymmetric Downlink Traffic Support Based on Cross-subframe Femtocell in OFDMA-TDD System**
Changbae Yoon, Korea Advanced Institute of Science and Technology; Dong-Ho Cho, KAIST
- 4 Price Discount Strategy for WSP to Promote Hybrid Access in Femtocell Networks**
Ang Li, Xi'an Jiaotong University; Xuewen Liao, Zhenzhen Gao, Yang Yang, Xi'an Jiaotong University
- 5 A Code-based Packet Recovery Mechanism in Fiber-Wireless (FiWi) Access Networks**
Qinglong Dai, Guochu Shou, Yihong Hu, Zhigang Guo, Beijing University of Posts and Telecommunications

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9F: Performance Analysis of Mobile Networks

Chair: Luca Foschini,

- 1 Design of Downlink Control Channels for Millimeter Wave Mobile Hotspot Network System**
Dae-Soon Cho, ETRI; Yeonggyu Shim, KAIST; Sungwoo Choi, Il-Gyu Kim, ETRI
- 2 Evaluation of 802.11 and LTE for Automotive Applications**
Angelos Goulianos, Nor Fadzilah Abdullah, Andrew Nix, Angela Doufexi, University of Bristol
- 3 High Speed CAN Transmission Scheme Supporting Data Rate of Up To 100Mbps**
Suwon Kang; Ji-Woong Choi, DGIST
- 4 Improving Scalability of Vehicle-to-Vehicle Communication with Prediction-based STDMA**
Daniel Verenzuela, Chang Liu, Lu Wang, Lei Shi, Royal Institute of Technology
- 5 ITS Applications of a Hybrid WiMAX-WLAN Network for Highway Tunnel Scenarios**
Michael Charitos, Theofilos Chrysikos, Grigorios Kalivas, Stavros A. Kotsopoulos, University of Patras

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9G: Carrier Frequency Offset & Phase Noise

Chair: Xiaodai Dong

- 1 An Approximate Method of Carrier Frequency Offset (CFO) Estimation for OFDM System**
Dajin Wang, Beijing Telecommunication R&D center, Samsung Electronics; Ou Wang, BUPT
- 2 Partial Power and Rate Adaptation for MQAM/OFDM Systems under CFO**
Zhicheng Dong, Pingzhi Fan, Southwest Jiaotong University; Erdal Panayirci, Kadir Has University; Xianfu Lei, Utah State University
- 3 Variance Transfer Chart Analysis of an OFDM-IDMA System with Carrier Frequency Offset**
Werner G. Teich, University of Ulm; Lianghai Ji, Univ of Kaiserslautern
- 4 Phase Noise Analysis in Passband Transmitted Reference Pulse Cluster UWB Communications**
Zhonghua Liang, Changan University; Xiaodai Dong, Guowei Zhang, University of Victoria; Mei Rong, Changan University
- 5 Robust Hyperbolic Σ - Ψ Based No Delay Tanlock Loop for Wireless Communications**
Ehab Salahat, Mahmoud Al-Qutayri, Saleh Al-Araji, Khalifa University of Science Technology and Research

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9H: Cooperative Communications III

Chair: Shengli Zhang

- 1 Analysis of Outage and Throughput for Opportunistic Cooperative HARQ Systems over Time Correlated Fading Channels**
Xuanxuan Yang, University of Macau; Haichuan Ding, Beijing Institute of Technology; Zheng Shi, Shaodan Ma, University of Macau; Pan Su, The Southeast University
- 2 Exploiting Self-information to Improve the Performance of Multi-way Relay Channels**
Shaham Sharifian, University of Victoria; Behnam Hashemitabar, Monash University; Aaron Gulliver, University of Victoria
- 3 Performance Analysis of Fiber-optic Inband Relaying in the Presence of Self-interference**
Hiroyuki Otsuka, Naohiro Tanoi, Naoto Ogura, Kogakuin University; Takahiro Kubo, Takahiro Asai, Yukihiko Okumura, NTT DOCOMO, Inc.
- 4 Sub-Sampling Quantize-and-Forward Schemes for Relay Networks**
Jing Zhai, Wenbo Xu, Kai Niu, Beijing University of Posts and Telecommunications; Yue Wang, Huawei Technologies Co., Ltd.
- 5 BICM-Based Cooperative Communication Systems with Relay Selection: Constellation and Multiplexer Design**
Muhammad Talha Malik, The University of British Columbia; Md. Jahangir Hossain, University of British Columbia; Mohamed-Slim Alouini, KAUST

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9I: Wireless Sensor Networks

Chair: Thomas Kunz

- 1 Active Period Reuse Mechanism for Autonomous Active Period Selection in Cluster-tree Traffic Adaptive IEEE 802.15.4 WSNs with Cluster Mobility**
Kazuo Mori, Katsuhiro Naito, Hideo Kobayashi, Mie University
- 2 An Efficient Deployment Heuristic to Support Temporal Coverage of Heterogeneous Objects in Rotatable and Directional (R&D) Sensor Networks**
You-Chiun Wang, National Sun Yat-Sen University; Shin-En Hsu, National Sun Yat-sen University

3 Distributed Sink Tree Construction in Wireless Sensor Networks with Promiscuous Learning
Jayashree Badarinath, Sridhar Radhakrishnan, University of Oklahoma; Venkatesh Sarangan, Innovation labs, TCS Chennai, India; Mahendran Veeramani, University of Oklahoma

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10A: Distributed MIMO

Chair: Meng Cai

- 1 Design Criteria for Distributed Antenna Systems**
Chunlong He, Southeast University; Geoffrey Y. Li, Georgia Tech
- 2 Performance Analysis of Randomized Distributed Space-Time Codes over Composite Gamma/Lognormal Fading Channels**
Jacopo Soffritti, Blekinge Institute of Technology; Trung Q. Duong, Queen's University Belfast; Maria Luisa Merani, University of Modena and Reggio Emilia, Italy; Hans-Jürgen Zepernick, Blekinge Institute of Technology
- 3 Scaling Law of Feedback Bits for Distributed Antenna Systems with Limited Feedback**
Eunsung Park, Sang-Rim Lee, Hoon Lee, Inkyu Lee, Korea University
- 4 Bit Allocation and Pairing Methods for Distributed Antenna Systems with Limited Feedback**
Hoon Lee, Eunsung Park, Haewook Park, Inkyu Lee, Korea University
- 5 A New Carrier Frequency Offset Estimation Approach for Distributed Line of Sight Millimeter Wave MIMO Systems**
Meng Cai, Rui Lv, Dafeng Tian, Qiao Liu, Kun Li, Huawei technologies co. ltd.

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10B: Interference Management

Chair: Long Le

- 1 A Frequency Domain Scheduling for Uplink Single Carrier Non-orthogonal Multiple Access with Iterative Interference Cancellation**
Jungo Goto, Osamu Nakamura, Kazunari Yokomakura, Yasuhiro Hamaguchi, Sharp Corporation; Shinsuke Ibi, Seiichi Sampei, Osaka University
- 2 LLR Calculation based on Interference Cancellation with channel estimation error for Non-orthogonal Multiple Access**
Yuji Chida, Yukitoshi Sanada, Keio University
- 3 Link Performance Abstraction for Interference-Aware Communications (IAC)**
Heunchul Lee, Jonghan Lim, Wonwoo Park, Teayoon Kim, Samsung Electronics
- 4 Proportional Fair-Based Joint Optimization of Cell Association and Inter-cell Interference Coordination for Heterogeneous Networks**
Yoshitaka Ikeda, Tokyo University of Science; Shozo Okasaka, Masayuki Hoshino, Panasonic Corporation; Kenichi Higuchi, Tokyo University of Science
- 5 Time Domain Inter-cell Interference Coordination for Dense Small Cell Deployments**
Jing Wang, Liu Liu, DOCOMO Beijing Communications Laboratories Co., Ltd; Kazuaki Takeda, NTT DOCOMO Inc.; Huiling Jiang, DOCOMO Beijing Communications Laboratories Co., Ltd

4 Energy Optimization in Redundant WSNs under Deterministic and Probabilistic Sensing Models
Ibrahima Diané, Rahim Kacimi, University of Toulouse; Zoubir Mammeri, Paul Sabatier University; Ibrahima Niang, University of Dakar

5 A Deployment Scheme for Lifetime Enhancement of Heterogeneous Wireless Sensor Network

Xiaoshuang, Liu, Guixia Kang, Beijing University of Posts and Telecommunications

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10C: Resource Allocation in Cognitive Radio

Chair: Zahra Ahmadian

- 1 User Assignment, Power Allocation, and Mode Selection Schemes in Cognitive Radio Networks**
Guftaar Sidhu, Salman Shah, COMSATS Institute of Information Technology, Islamabad; Feifei Gao, Tsinghua University
- 2 Power Allocation for Non-Orthogonal Amplify-and-Forward Cognitive Relay Networks**
Mahmoud Elsaadny, Chintla Tellambura, Hai Jiang, University of Alberta
- 3 Resource Allocation for Intra-Cluster D2D Communications Based on Kuhn-Munkres Algorithm**
Nannan Chen, Tian Hui, Zhibo Wang, Beijing University of Posts and Telecommunications
- 4 GPS-Assisted Spectrum Allocation for Cognitive Radio Networks with Femtocells**
Yousef Shnaiver, Saad Al-Ahmadi, Wessam Mesbah, Salam A. Zummo, King Fahd University of Petroleum and Metal
- 5 The Bidirectional Algorithm for Channel Selection Using a Two-radio Model**
Michel Barbeau, Carleton University; Gimer Cervera, Universidad Tecnologica Metropolitana; Joaquin Garcia-Alfaro, Telecom SudParis; Evangelos Kranakis, Carleton University

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10D: Broadcast & Multiple Access

Chair: Mahmoud Taherzadeh

- 1 A Scalable Mobile Video Broadcast Scheme Using 3D Wavelet Transform**
Quan Wang, Xiaocheng Lin, Yu Liu, Zhang Lin, Xiaofei Wu, Beijing University of Posts and Telecommunications
- 2 Binary Codebook Design for Broadcast System with Low Cost Receiver**
Shin-Lin Shieh, Himadri Subrah Saha, Rakhi Roy, National Taipei University
- 3 SCMA Codebook Design**
Mahmoud Taherzadeh, Hosein Nikopour, Alireza Bayesteh, Hadi Baligh, Huawei
- 4 Complexity-reduced Per-Antenna Multiple Access Interference Cancellation for DAN Using DS-CDMA**
Shohei Inoshita, Hiroyuki Miyazaki, Fumiyouki Adachi, Tohoku University
- 5 Improved Iterative Detection of Multiuser Signals with Fast Frequency-Hopping Modulation**
Tung Nguyen, Ha H. Nguyen, University of Saskatchewan

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10E: Resource Management

Chair: Kezhi Wang

- 1 Characterizing and Exploiting Temporal-Spatial Radio Resource Margins in Cellular Networks**
Zhiyong Feng, Jia Min, Xiao Yan, Beijing University of Posts and Telecommunications; Yu Gao, China Mobile Beijing Company; Qixun Zhang, Yue Zhang, Beijing University of Posts and Telecommunications

2 Rate-Optimization for Scalable Video Transmission over Wireless Networks

Zubeir Bocus, Toshiba Research Europe Ltd.; Justin Coon, Oxford University

3 Resource Allocation for Smart Grid Communication in Uplink OFDMA System

Yuwei Ren, Beijing University of Posts and Telecommunications; Yingmin Wang, State Key Laboratory of Wireless Mobile Communications; Guixian Xu, Qing Huang, Beijing University of Posts and Telecommunications

4 Wireless Multi-view Video Streaming with Subcarrier Allocation by Frame Significance

Takuya Fujihashi, Osaka University; Shiho Kodera, Shunsuke Saruwatari, Shizuoka University; Takashi Watanabe, Osaka University

5 Performance Evaluation of a Resource Allocation Scheme for Mixed Traffic in Dynamic-TDD Network

Yuancao Li, Zhesheng Lin, Liu Huan, Yuehong Gao, Xin Zhang, Beijing University of Posts and Telecommunications

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10F: Performance Analysis III

Chair: Saleh Al-Araji

1 Measuring the Magnitude of Envelope Fluctuations: Should We Use the PAPR?

Pedro Bento, João Nunes, Marco Gomes, Instituto de Telecomunicações - University of Coimbra; Rui Dinis, Universidade Nova de Lisboa; Vitor Silva, Instituto de Telecomunicações - University of Coimbra

2 Unified Performance Analysis of Maximal Ratio Combining in η - μ , λ - μ and κ - μ Generalized Fading Channels

Ehab Salahat, Khalifa University

3 On the Performance of Hybrid ARQ with Incremental Redundancy over Amplify-and-Forward Dual-Hop Relay Networks

Amir Hadjtaieb, Ali Chelli, Mohamed-Slim Alouini, King Abdullah University of Science and Technology

4 On the Capacity of FSO Links Under Lognormal and Rician-Lognormal Turbulences

Imran Shafique Ansari, Mohamed-Slim Alouini, King Abdullah University of Science and Technology; Julian Cheng, University of British Columbia

5 Performance Analysis of Switching based HybridFSO/RF Transmission

Muneer Usman, University of Victoria; Hong-Chuan Yang, University of Victoria; Mohamed-Slim Alouini, KAUST

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10G: Channel Measurements & Modelling

Chair: Marco Di Renzo

1 Experimental Comparison of Antenna Clustering Strategies in MIMO Distributed Antenna Systems

George Gordon, Michael Crisp, Richard Penty, Ian White, University of Cambridge

2 Novel Wi-Fi - LTE Real-time Traffic Steering - First Field Measurement Results

Björn Halvarsson, Oscar Zee, Ericsson AB

3 MIMO Vehicle to Vehicle Channels: An Experimental Study

Mahmoud Ashour, Qatar University; Ahmed Attia, Nile University; Ahmad ElMoslimany, Arizona State University; Yahya Mohasseb, Amr El-Keyi, Nile University

4 Field Experiments on Antenna Element Grouping for Smart Vertical MIMO in LTE-Advanced Downlink

Daiki Takeda, Yuki Inoue, Keisuke Saito, Teruo Kawamura, Hidehiro Andoh, NTT DOCOMO, Inc.

5 Preliminary system-level simulation results for the 3GPP 3D MIMO Channel Model

Aman Jassal, University of British Columbia; Hajer Khanfir, Sofia Martinez Lopez, Orange Labs

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10H: Routing

Chair: Thomas Kunz

1 Inter-domain Routing for Tactical Mobile Ad-hoc Networks

Izegbuwa Okundaye, Thomas Kunz, Carleton University; Semra Gulder, Communications Research Centre Canada

2 Distance-aware Overlay Routing with AODV in Large Scale Ad Hoc Networks

Ying Liu, Xiruo Liu, Wade Trappe, Rutgers, The State University of New Jersey; Radhika Roy, Army CERDEC

3 Adaptive Energy-based Updating Algorithm in Opportunistic Routing

Chu Jinjin, Wu Muqing, Cao Shiwei, Wang Dongyang, Beijing University of Posts and Telecommunications

4 Enhancing Convergence with Optimal Feedback for Controlled Self-Organizing Networks

Naomi Kuze, Daichi Kominami, Osaka University; Kenji Kashima, Kyoto University; Tomoaki Hashimoto, Masayuki Murata, Osaka University

5 Novel Routing Approach for the TSCH mode of IEEE 802.15.14e in Wireless Sensor Networks with Mobile Nodes

Marc Barceló, Universitat Autònoma de Barcelona; Alejandro Correa, Universitat de Barcelona; Xavi Vilajosana, Universitat Oberta de Catalunya; Antoni Morell, Jose Lopez Vicario, Universitat Autònoma de Barcelona

Wednesday, 17 September 2014 15:30-17:00 Thompson

10I: Security & Privacy in Wireless Network

Chair: Eric Renault

1 Security-Reliability Tradeoff for Relay Networks in the Presence of Channel Estimation Error

Jia You, Zhangdui Zhong, Gongpu Wang, Lan Dong, Beijing Jiaotong University

2 Mutual Authentication Method for WSNs based on the Three-Card Trick Ancient Card Game

Eric Renault, Institut Télécom -- Télécom SudParis; Selma Boumerdassi, CNAM / CEDRIC

3 Relay Selection for Multi-Destination in Cooperative Networks with Secrecy Constraints

Esa Alotaibi, Khairi Hamdi, University of Manchester

4 Car2X Communication - Putting Security Negotiation into Practice

Sabir Idrees, Samiha Ayed, Nora Cuppens-Boulahia, Frederic Cuppens, Telecom-Bretagne

5 Dynamic Power Allocation over Multiple-Access Channels for Secrecy-Rate Maximization

Nader Mokari Yamchi, Fateme Arian, Tarbiat Modares University; Saeedeh Parsaefard, Tho Le-Ngoc, McGill University



*6th IEEE International Symposium on
Wireless Vehicular Communications*

Final Program



14 – 15 September 2014

Vancouver, Canada

Welcome from the WiVeC Organizing Committee

It is our pleasure to welcome all attendees to the 6th IEEE International Symposium on Wireless Vehicular Communications (IEEE WiVeC2014).

WiVeC occurs every 18 months, and after successful WiVeC symposia in 2007 (Baltimore), 2008 (Calgary), 2010 (Taipei), 2011 (San Francisco) and 2013 (Dresden), the 6th IEEE WiVeC symposium returns to North America to take place in Vancouver on 14-15 September 2014. The symposium is co-located with the 2014 IEEE 80th Vehicular Technology Conference VTC2014-Fall.

We have selected 20 high-quality papers for oral presentations from the 57 submissions, showcasing novel ideas and recent trends in this continuously maturing area. Topics cover a broad range of wireless vehicular communication: from antennas to

applications. In addition, four demos are exhibited on V2X and related activities.

We would like to thank all authors who submitted their work to WiVeC2014 as well as all 34 members of the TPC for providing timely and high quality reviews. We are grateful to the publicity chair Zhengguo Sheng, panel chair Carl Kuhnke and demonstration co-chairs Gaurav Bansal and Sichao Yang. Finally, our thanks go to the VTS and the local VTC organizers, and in particular Javier Gozalvez, for guidance and support.

We look forward to welcoming you to Vancouver and WiVeC2014.

Azzedine Boukerche, Soumaya Cherkaoui,
Victor C.M. Leung, Yaser P. Fallah and Richard Yu
IEEE WiVeC General & TPC Co-Chairs

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Keynote

Sunday 14 September 2014 13.45 – 15.00 Seymour

Future Technology Trends for Vehicular Communication is Vehicular

Xinzhou Wu, Principal Engineer/Manager at Qualcomm Research

Recently, USDOT announced intention to mandate DSRC in all new vehicles at a future year. This certainly shed light to a journey the automotive industry embarked about a decade ago and was very well received by the key stakeholders. Meanwhile, over the last decade, the wireless telephony technology has evolved from a 2G voice-centric communication network to a LTE-based 4G high-throughput data communication network. Similarly, Wi-Fi based unlicensed technology also completed a 100x throughput improvement (from IEEE802.11a/b to IEEE802.11ac/ad) by employing the latest wireless communication and modem processing technologies. In contrast, the coming V2V deployment is still going to be based on a communication technology selected a decade ago -- IEEE802.11p, which is the half clocked version of IEEE802.11a.

In this talk, we will discuss the challenges and strategies to evolve the yet-to-come V2V network deployment to incorporate the latest communication technology advances. Further, we will also discuss a few futuristic communication technologies, including LTE-Unlicensed, LTE-Direct and Milli-meter wave communications, and how they can reshape the vehicular communication and enable future use cases.

As a Principal Engineer/Manager at Qualcomm Research, **Dr. Xinzhou Wu** leads Qualcomm research activities in the vehicular space. He currently holds 80 US patents and has more than 100 pending US patent applications in the area of wireless communications and wireless networking. He is a co-author of the book “OFDMA Mobile Broadband Communications – A Systems Approach” with Dr. Junyi Li and Dr. Rajiv Laroia.

Dr. Wu received the B.E. degree from Tsinghua University, China in 1998, the M.S. and Ph.D. degrees from University of Illinois at Urbana-Champaign in 2000 and 2004, all in electrical engineering. From 2005 to 2006, he was a Member of Technical Staff at Flarion Technologies, which pioneered in OFDMA based cellular technologies.

Panel Session

Monday 15 September 2014, 18:00–20:00 (Salon DEF)

Wireless Technologies for Freight Security and Efficiency

Chair: **David Michelson** *University of British Columbia, Canada*
Panelists: **Garland Chow** *Sauder School of Business, University of British Columbia, Canada*
Dalibor Pokrajac *Executive Vice President of Engineering, GuardRFID, Canada*
D. Dean Brickerd Jr. *Vice President, Technical Services, ORBCOMM Inc., USA*

The secure and efficient movement freight and goods is the cornerstone of the modern global economy. Both government and industry have expended considerable effort to streamline the flow of freight and goods across borders, at freight terminals and at intermodal transfer points. While legislative changes and development of new inspection technology has played a critical role in increasing freight security and efficiency during the past decade, wireless technology remains the most important technique for streamlining the exchange and flow of information at all points in the process. Garland Chow will open the session by summarizing the business case for using wireless technologies to enhance freight security and efficiency. Dalibor Pokrajac of Guard RFID Solutions will review the use of active RFID and related short-range wireless technologies to meet this goal and progress in adopting the latest active RFID technology, IEEE 802.15.4f. Dean Brickerd of Orbcomm will anchor

the session an in depth presentation on Orbcomm's vision for the use of wide area wireless technologies to meet this goal and recent accomplishments in satellite-based M2M communications including the recent launch of second generation Orbcomm satellites from Cape Canaveral, Florida this past July. The session will conclude with a short panel discussion and question and answer session.

Garland Chow is Associate Professor in the Operations and Logistics Division and Director of the Bureau of Intelligent Transportation Systems and Freight Security both in the Sauder School of Business at the University of British Columbia. Dr. Chow teaches and writes in the fields of supply chain, business logistics and freight transport management. He is a frequent speaker before professional associations and executive programs and is a member of several editorial boards and an active participant in Supply Chain and Logistics Canada, which awarded him their 2003 National Mentor Award and 2008 National Service Award. He also serves on the accreditation review panel of the Canadian Supply Chain Sector Council. His current research interests include: offshore and nearshore sourcing strategy and evaluation, total logistics costs decision making, and the modelling of security and efficiency of cross-border and global freight movement. He earned his BS and MBA degrees from the University of Maryland and doctorate from Indiana University.

Dalibor Pokrajac obtained his BSc degree in Electrical Engineering degree from University of Zagreb, Croatia in 1989. He spent early days of his carrier as hardware development engineer. In 1994 he moved to Canada where initially he worked on distributed industrial controls products, with focus on real-time data acquisitions. Since 1999 he is involved in various capacities with low power RF communications, primarily RFID/RTLS. Initially, that involvement was on device development level and later he moved to higher levels of development and management. In 2001 he started participation within IEEE 802.15 committee, where since 2009 within 802.15.4f group he was actively involved in development of 433

MHz PHY focused on low power communication used by RFID/RTLS devices. Since 2010 he is active within ISO SC31 committee on inclusion of 802.15.4f PHY/MAC layers in ISO/IEC 18000-7 standard. New revision of this standard was ratified in 2014. Pokrajac is Professional Engineer and member of Standards Council of Canada.

Dean Brickerd has been at ORBCOMM for more than 22 years, during which time he has held a variety of positions involving system definition, specification development, system engineering, vendor management and product development. He is currently responsible for the development of new products and providing technical support to ORBCOMM's value-added resellers (VARs). In this role, he is the main technical point of contact for the company and manages the development of new antennas, new ORBCOMM modems, embedded software, system integration, and field testing of completed products. He has also worked directly with ORBCOMM's VARs to develop and/or debug their current systems. In addition, he is responsible for the certification of ORBCOMM subscriber communicators as part of the Federal Communications Commission's requirements for use on the ORBCOMM satellite network. Prior to ORBCOMM, Mr. Brickerd worked for GTE Spacenet, where he provided systems engineering support for the deployment of VSAT networks, the U.S. government as well as Booz, Allen & Hamilton and spent four years in the U.S. Army Signal Corps. Mr. Brickerd has Bachelor of Science degrees in Biology from Purdue University and Computer Engineering from North Carolina State University along with a Master's of Science in System Engineering from George Mason University.

VTC Opening Plenary

WiVeC attendees are invited to the VTC2014-Fall opening plenary on Monday, 15 September, from 8.30 – 10.30 in Salon DEF. Full details can be found on Page 14.

WiVeC Technical Sessions

Sunday, 14 September 2014 8:30-10:00 Seymour

11W: Wireless & Antenna

- 1 Antenna Selection Algorithm with Improved Channel Predictor for Vehicular Environment**
Mona Shemshaki, Christoph Mecklenbräuer, Institute of Telecommunications, Austria
- 2 Finite-State Markov Channel Modeling for Vehicle-to-Infrastructure Communications**
Siyu Lin, Yan Li, Yuanxuan Li, Beijing Jiaotong University; Ai Bo, Tsinghua University; Zhangdui Zhong, Beijing Jiaotong University
- 3 Improved Near Field Focusing of Antenna Arrays with Novel Weighting Coefficients**
Shun-Ping Chen, Darmstadt University of Applied Sciences
- 4 SDR-proved Adaptive OFDM Guard Interval Scheme for Rapidly Varying Time-Dispersive Vehicular Broadcast Channels**
Norman Franchi, Matej Kloc, Robert Weigel, University Erlangen-Nuremberg

Sunday, 14 September 2014 10:30-12:00 Seymour

12W: Radio & Networks I

- 1 A Ray Tracing Algorithm for Intelligent Transport Systems in Tunnels**
Mingming Gan, Zhinan Xu, The Telecommunications Research Center Vienna (FTW); Veronika Shivaldova, Vienna University of Technology; Alexander Paier, Kapsch TrafficCom; Fredrik Tufvesson, Lund University; Thomas Zemen, Forschungszentrum Telekommunikation Wien ftw.
- 2 Enhancing the Field of View Limitation of Visible Light Communication-based Platoon**
Mohammad Abualhoul, Mohamed Marouf, Oyunchimeg Shagdar, Fawzi Nashashibi, INRIA
- 3 Relaying for IEEE 802.11p at Road Intersection Using a Vehicular Non-Stationary Channel Model**
Zhinan Xu, Laura Bernado, Mingming Gan, Markus Hofer, The Telecommunications Research Center Vienna (FTW); Taimoor Abbas, Lund University; Veronika Shivaldova, Vienna University of Technology; Kim Mahler, Fraunhofer Heinrich Hertz Institute; Dieter Smely, Kapsch TrafficCom; Thomas Zemen, Forschungszentrum Telekommunikation Wien ftw.

4 Signal-to-Noise Ratio Modeling for Vehicle-to-Infrastructure Communications

Veronika Shivaldova, Andreas Winkelbauer, Christoph Mecklenbräuer, Vienna University of Technology

Sunday, 14 September 2014 15:30-17:00 Seymour

13W: Radio & Networks II

1 Impact of a Truck as an Obstacle on Vehicle-to-Vehicle Communications in Rural and Highway Scenarios

Dimitrios Vlastaras, Taimoor Abbas, Lund University; Mikael Nilsson, Volvo Car Corporation; Russ Whiton, Magnus Olbäck, Volvo Group Trucks Technology; Fredrik Tufvesson, Lund University

2 Infrastructure-to-Vehicle Throughput in TVWS for Urban and Rural Environments

Nor Fadzilah Abdullah, Angelos Goulianos, Denys Berkovskyy, Di Kong, Evangelos Mellios, Angela Doufexi, Andrew Nix, University of Bristol

3 Multiplicative Superposition Signaling Based Detection schemes for Heterogeneous-Speed Users

Caihong Yu, Li Hao, Southwest Jiaotong University

4 Spectrum Sensing with Energy Detection in Cognitive Vehicular Ad hoc Networks

Xiaomin Qian, Li Hao, Southwest Jiaotong University, China

Monday, 15 September 2014 11:00-12:30 Cypress 1

1A: WiVeC Network & MAC

1 Adaptive Content Control for Communication amongst Cooperative Automated Vehicles

Mohammad Fanaei, Amin Tahmasbi-Sarvestani, Yaser P. Fallah, West Virginia University; Gaurav Bansal, Toyota Info Technology Center; Matthew Valenti, West Virginia University; John Kenney, Toyota ITC

2 Comparing LIMERIC and DCC approaches for VANET Channel Congestion Control

Gaurav Bansal, Toyota Info Technology Center; Bin Cheng, Ali Rostami, Rutgers University; Katrin Sjöberg, Volvo Groups Trucks Technology; John Kenney, Toyota InfoTechnology Center; Marco Gruteser, WINLAB, Rutgers University

3 MAX-MIN based Buffer Allocation for VANETS

Luis Urquiza-Aguilar, Andrés Vázquez-Rodas, Universitat Politècnica de Catalunya; Carolina Tripp-Barba, Autonomic University of Sinaloa; Mónica Aguilar Igartua, Luis J. de la Cruz Llopis, Emilio Sanvicente Gargallo, Universitat Politècnica de Catalunya

4 Random Transmit Jitter Against Correlated Packet Collisions in Vehicular Safety Communications

Bernhard Kloiber, German Aerospace Center (DLR); Jérôme Härr, EURECOM; Fabian de Ponte Müller, Stephan Sand, German Aerospace Center (DLR)

Monday, 15 September 2014 14:00-15:30 Cypress 1

2A: WiVeC Applications & Security

1 Cooperative Localization based on Topology Matching

Seungtak Choi, Woosol Hur, Seung-Woo Seo, Seoul National University

2 Frame-based Mobility Estimation via Compressive Sensing in Delay-Tolerant Vehicular Networks

Waleed Alasmary, Shahrokh Valaee, Samah El-Tantawy, Baher Abdulhai, University of Toronto

3 Revisiting Attacker Model for Smart Vehicles

Jonathan Petit, Michael Feiri, University of Twente; Frank Kargl, University of Ulm

4 Wireless sensor network-assisted, autonomous mapping with information-theoretic utility

Steffen Beyme, Cyril Leung, The University of British Columbia

Monday, 15 September 2014 16:00-17:30 Stanley Park Ballroom

3W: WiVeC Demos

1 A V2X Communication System and Its Performance Evaluation Test Bed

Xuting Duan, Yue Yang, Daxin Tian, Yunpeng Wang, Tao Li, Beihang University

2 Demonstration of Multi-Channel Medium Access Control Protocol in Vehicular Power Line Communication (VPLC) using OMNeT++

Zhengguo Sheng, University of British Columbia; Morgan Roff, Queen's University; Roberto P. Antonioli, Federal University of Ceara, Brazil; Victor C. M. Leung, The University of British Columbia

3 Towards Zero on-site testing: Advanced Traffic Management & Control Systems simulation framework including communication KPIs and response to failure events

Marina Aguado, Christian Pinedo, Igor Lopez, Eduardo Jacob, University of The Basque Country; Carlos de las Muñozecas, Ines Ugalde, Lara Rodriguez, University of the Basque Country (UPV/EHU)

4 V2X Demonstration

Rekha Singoria, Escript; Joseph Peruski, Lars Wolleschensky, ESCRYPT Inc.

VTS Awards 2014

VTS Hall of Fame

William C.Y. Lee

in recognition of his pioneering and lasting contributions and impact in cellular and wireless communications.

Stuart F. Meyer Memorial Award

Gerhard Fettweis

for outstanding research, educational, and entrepreneur contributions to mobile communications devices and networks

James Evans Avant Garde Award

Lajos Hanzo

for outstanding research in theoretical wireless communications and leadership in service contribution

VTS Chapter of the Year

Galveston Bay Joint chapter

VTS Awards Committee: David Haccoun, Chair; Bih-Y. Ku; Javier Gozalvez; James Irvine; Gordon Stuber

2014 Jack Neubauer Memorial Award (Best Systems Paper)

Y.-C. Liang, K.-C. Chen, G.Y. Li, P. Mahonen

Cognitive Radio Networking and Communications: an Overview *IEEE Transactions on Vehicular Technology*, Vol. 60, No.7, pp.3386-3407, Sept. 2011

2014 Neal Shepherd Memorial Best Propagation Paper

S. Geng; J. Kivinen; X. Zhao; P. Vainikainen

Millimeter-Wave Propagation Channel Characterization for Short Range Wireless Communications, *IEEE Transactions on Vehicular Technology*, Vol. 58, No.1, pp.3-13, Jan 2000

2014 Best Vehicular Electronics Paper Award

S.G. Wirasingha & A. Hemadi

Classification and Review of Control Strategies for Plug-In Hybrid Electric Vehicles, *IEEE Transactions on Vehicular Technology*, Vol. 60, No.1, pp. 111-122, Jan 2011