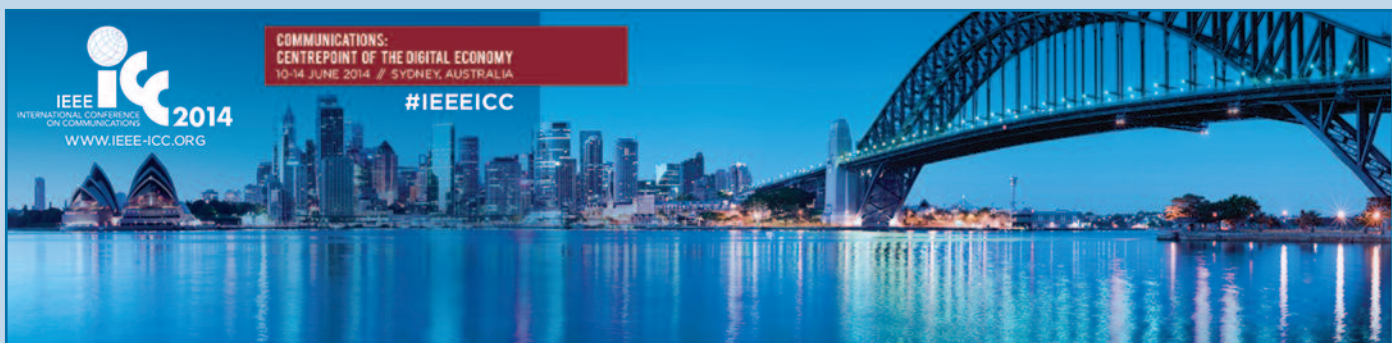


COMMUNICATIONS: CENTREPOINT OF THE DIGITAL ECONOMY



ADVANCE PROGRAM

IEEE INTERNATIONAL CONFERENCE
ON COMMUNICATIONS
10-14 JUNE 2014
SYDNEY, AUSTRALIA



The IEEE International Conference on Communications (ICC) the leading international venue dedicated to the advancement of wireless and wireline communications worldwide, will host more than 1,500 industry professionals, scientists, academics and government officials attending presentations highlighting the entire range of global voice, data, image and multimedia technologies.

Join us at IEEE ICC for five full days of original paper presentations, tutorials, workshops, keynotes, industry & business panels and social events designed to further career opportunities and the in-depth understanding of the latest communications advancements worldwide.

TABLE OF CONTENTS

Keynote Speakers .....	.2	Workshops .....	.14
Industry & Business Panels .....	.5	Registration Information .....	.18
Technical Symposia .....	.6	Hotels .....	.19
Tutorials .....	.9	Patrons & Exhibitors	BC

PROGRAM AT A GLANCE

Time/Day	Tuesday 10 June		Wednesday 11 June		Thursday 12 June		Friday 13 June		Saturday 14 June	
08:00-09:00	Registration		Registration		Registration		Registration		Registration	
09:00-10:30	AM Tutorials	AM Workshops	Welcoming & Opening Ceremony "The Future of Applications"		Technical Symposia	Industry Forums	Technical Symposia	Industry Forums	AM Tutorials	AM Workshops
10:30-11:00	Coffee Break		Coffee Break		Coffee Break		Coffee Break		Coffee Break	
11:00-12:30	AM Tutorials	AM Workshops	Technical Symposia	Industry Forums	Plenary and Keynote Session "Infrastructure for the Digital Economy"		Plenary and Keynote Session "Defining the Wireless Future"		AM Tutorials	AM Workshops
12:30-14:00	Lunch Break		12:45-14:15 Awards Luncheon		Lunch Break		Lunch Break		Lunch Break	
14:00-15:30	PM Tutorials	PM Workshops	14:30-16:00 Technical Symposia	14:30-16:00 Industry Forums	Technical Symposia	Industry Forums	Technical Symposia	Industry Forums	PM Tutorials	PM Workshops
15:30-16:00	Coffee Break		Coffee Break		Coffee Break		Coffee Break		Coffee Break	
16:00-17:30	PM Tutorials	PM Workshops	16:00-16:30 Technical Symposia	16:30-18:00 Industry Forums	Technical Symposia	Industry Forums	Technical Symposia	Industry Forums	PM Tutorials	PM Workshops
17:30-18:00										
18:00-19:00	First Time Attendees Reception									
19:00-22:00	Welcome Reception (Exhibition Official Opening)				Conference Banquet					

KEYNOTE SPEAKERS

For further updates, visit <http://icc2014.ieee-icc.org/speakers.html>

WEDNESDAY • BIJAN JABBARI

THURSDAY • ROD TUCKER



Wednesday, 11 June 2014
09:30 – 10:30

Bijan Jabbari
Professor
George Mason University

Wireless Evolution: From Connecting People to Connecting Machines

Advances in wireless technology have made access from smart devices to cloud and multimedia content delivery services part of our daily lives. In the past decade, considerable progress has been made in ecosystems built upon mobile cellular and wireless Internet access technologies. While present wireless technologies have resulted in significant increase in demand for bandwidth, future applications - especially machine-to-machine - will result in massive data traffic. Although part of the solution to this challenge can be envisioned through cognitive radio networking technology, which will be discussed in this presentation, there remain other challenges to address the forthcoming innovative machine-to-machine applications and their sustained impact. In this talk, we review key recent innovations in wireless technology and discuss three main requirements that must be met to achieve a functional wireless ecosystem for our connected society including connected machines.

Biography: Bijan Jabbari is a professor in the department of electrical and computer engineering at George Mason University in Fairfax, Virginia, USA. He is also an affiliated faculty member with Telecom Paris-Tech (ENST-Paris) in France. He received his MS and Ph.D. degrees in electrical engineering from Stanford University, Stanford, California.

Dr. Jabbari's area of specialization and interest is in wireless communication networks with particular emphasis on multi-user access, resource allocation, and performance optimization. He received the IEEE Fellow grade, the IEEE Millennium Medal and the Washington DC Metropolitan Area Engineer of the Year Award. He is a recipient of the Outstanding Faculty Research Award at the School of Engineering of George Mason University.

Dr. Jabbari served as the editor of Wireless Multiple Access for the IEEE Transactions on Communications, was an international division editor for Wireless Communications (Div. II) of the Journal of Communications and Networks, and was on the editorial board of the Proceedings of the IEEE, as well as serving in different editorship capacities for several other journals. He has been an advisor to the wireless communications industry, government and the European Commission.



Thursday, 12 June 2014
11:00 – 11:45

Rod Tucker
Emeritus Laureate Professor
University of Melbourne

Australia's National Broadband Network: Politics Confronts Technology

When first announced five years ago, Australia's National Broadband Network (NBN) promised to connect fiber to 93% of Australian homes and businesses. However, a new government, elected in 2013, is proposing to use lower-cost and lower-bandwidth copper-based connections in place of fiber. This talk provides an overview of the current status of the NBN project as well as a perspective on how the political and technology debates shaped the extraordinary story of Australia's brief flirtation with a national high-speed fiber network.

Biography: Rod Tucker is an Emeritus Laureate Professor at the University of Melbourne and a Fellow of the IEEE. He has previously held positions at the Plessey Company, AT&T Bell Laboratories, Hewlett Packard Laboratories, and Agilent Technologies. He has served as a member of the Board of Governors of the IEEE Photonics Society and the Administrative Committee of the IEEE Microwave Theory and Techniques Society. He was Editor-in-Chief of the IEEE Transactions on Microwave Theory and Techniques from 1988 – 1990, and Associate Editor of IEEE Photonics Technology Letters from 1997 – 2006. From 2008 – 2011, he was Vice-President, Publications of the IEEE Photonics Society. In 2009, he served on the Australian Federal Government's Panel of Experts, which provides advice on the establishment of a National Broadband Network in Australia. Professor Tucker is a Board Member of GreenTouch, a global consortium focused on research and development in energy-efficient information and communications networks.

KEYNOTE SPEAKERS

For further updates, visit <http://icc2014.ieee-icc.org/speakers.html>

THURSDAY • RAHIM TAFAZOLLI



Thursday, 12 June 2014
11:45 – 12:30

Rahim Tafazolli
Director, CCSR and 5GIC
University of Surrey

5G New Infrastructure for Digital Economy and Connected Society

The talk will present some economic and market drivers for start of research on 5G. It will present justifications that there is a need for a new approach to 5G which is fundamentally different from previous generations of mobile cellular systems. In achieving this vision, it will also propose a number of strategically important research and innovation areas for research community which are also pursued in the 5G Innovation Centre (5GIC) at the University of Surrey and their industrial members. It will also provide a list of requirements and targets that need to be set by standardization bodies and taken into consideration by national and international regulators.

Biography: **Rahim Tafazolli** is the Director of the Centre for Communications Systems Research (CCSR) and 5G Innovation Centre (5GIC), University of Surrey in the UK. He has published more than 500 research papers in refereed journals, international conferences and as invited speaker. He is the editor of two books on "Technologies for Wireless Future" published by Wiley's Vol.1 in 2004 and Vol.2 2006. He is currently chairman of EU Net!Works Technology Platform Expert Group, board member of the UK Future Internet Strategy Group (UK-FISG). He was appointed as Fellow of WWRF (Wireless World Research Forum) in April 2011, in recognition of his personal contribution to the wireless world. As well as heading one of Europe's leading research groups.

FRIDAY • CHIH-LIN I



Friday, 13 June 2014
11:00 – 11:45

Chih-Lin I
Chief Scientist of Wireless Technologies
China Mobile Research Institute

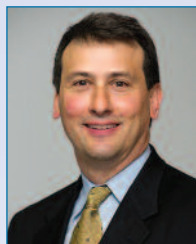
Vision 2020: Perspectives of Mobile Operators (5G: Data Rate and More)

With the issuing of TD-LTE licenses in mainland China, the world's largest mobile market entered the 4G era before the end of 2013. Meanwhile, the whole world is trying to see through the veil blurring our view of the wireless society in the year 2020, widely considered as the 5G era. In the last year, 5G has become the hottest key word in the wireless industry.

One consensus is that the next generation wireless system will face a 1000x increase in traffic load, prompting several questions: (1) how to increase network capacity dramatically while keeping the TCO at a reasonable level? (2) what user needs must be met by 5G? (3) how will wireless technologies and mobile infrastructure then be integrated? (4) are there any particular needs from the mobile operator's point of view? (5) how will mobile operators stay on center stage in the future? (6) what kind of technologies are they looking for? (7) what is the likely roadmap towards the next generation mobile network? This talk provides insight into these questions, sharing CMCC's view as well as presenting selected technology updates.

Biography: **Chih-Lin I** is the China Mobile Chief Scientist of Wireless Technologies, in charge of advanced wireless communication R&D effort of China Mobile Research Institute (CMRI). She established the Green Communications Research Center of China Mobile, spearheading major initiatives including 5G Key Technologies R&D; high energy efficiency system architecture, technologies, and devices; green energy; C-RAN and soft base station.

Chih-Lin received her Ph.D. degree in Electrical Engineering from Stanford University, has almost 30 years of experience in wireless communication area. She has worked in various world-class companies and research institutes, including wireless communication fundamental research department of AT&T Bell Labs; Headquarter of AT&T, as Director of Wireless Communications Infrastructure and Access Technology; ITRI of Taiwan, as Director of Wireless Communication Technology; Hong Kong ASTRI, as VP and the Founding GD of Communications Technology Domain. Chih-Lin received the Trans. COM Stephen Rice Best Paper Award, and is a winner of CCCP "National 1000 talent" program. She was an elected Board Member of IEEE ComSoc, Chair of ComSoc Meeting and Conference Board and the Founding Chair of IEEE WCNC Steering Committee. She is currently an Executive Board Member of GreenTouch and a Network Operator Council Member of ETSI NFV.



Friday, 13 June 2014
11:45 – 12:30

Theodore (Ted) S. Rappaport
 Professor
 New York University

Millimeter Wave Wireless Communications: The Renaissance of Computing and Communications

The wireless and internet industries are both about 30 years old and, during the past few decades, the average consumption of digital data per citizen on the planet has doubled every 40 months. Given recent expansions in optical backbones and local area connectivity investments throughout the world, spurred on by the overwhelming success of the Internet, mobile telephones, smartphones and WiFi, the world is about to see a staggering increase in the growth and demand for data. Recently, millimeter wave and terahertz frequencies have been shown to offer capabilities never before imagined for high-speed wireless connectivity, both for mobile communications and fixed backhaul. This talk explores the remarkable expansion in capacity and services that future millimeter-wave communications will offer, and illustrates many technical problems that are within reach of being solved to enable completely new applications and solutions that will bring wireless communications into its Renaissance.

Biography: Theodore (Ted) S. Rappaport is the David Lee/Ernst Weber Professor of Electrical and Computer Engineering at the Polytechnic Institute of New York University (NYU-Poly) and is a professor of computer science at New York University's Courant Institute of Mathematical Sciences. He is also a professor of radiology at the New York University School of Medicine.

Rappaport is the founder and director of NYU WIRELESS, one of the world's first academic research centers to combine wireless engineering, computer science, and medicine. Earlier in his career, he founded two of the world's largest academic wireless research centers: the Wireless Networking and Communications Group (WNCG) at the University of Texas at Austin in 2002, and the Mobile and Portable Radio Research Group (MPRG), now known as Wireless@Virginia Tech, in 1990. He has founded two companies, both sold to publicly traded firms, that have pioneered some of the technologies now used in the wireless industry.

Rappaport is a pioneer in the fields of radio wave propagation for cellular and personal communications, wireless communication system simulation, analysis and design, and broadband wireless communications circuits and systems at millimeter wave frequencies. His research has influenced many international wireless standard bodies over three decades, and he and his students have invented measurement equipment, simulation methodologies, and analytical approaches for the exploration and modeling of radio propagation channels and communication system design in a vast range of spectrum bands for emerging wireless systems. More recently, his work has explored the millimeter wave (mmWave) bands for future broadband access.

In 2006, Rappaport was elected to the Board of Governors of the IEEE Communications Society (ComSoc), and to the Board of Governors of the IEEE Vehicular Technology Society (VTS) in 2008 and again in 2011. He is a fellow of the IEEE, is a member of the board of the Marconi Society, and serves on the editorial boards of several academic and technical journals. He received the Marconi Young Scientist Award in 1990, an NSF Presidential Faculty Fellowship in 1992, the Sarnoff Citation from the Radio Club of America in 2000, the Fredrick E. Terman Outstanding Electrical Engineering Faculty Award from the American Society for Engineering Education in 2002, the Stuart F. Meyer Award from the IEEE Vehicular Technology Society in 2005, the Sir Monty Finnieston Medal from the IET in 2011, and the William E. Sayle achievement award from the IEEE Education Society in 2012.

Rappaport has over 100 U.S. or international patents issued or pending and has authored, co-authored, and co-edited over 200 papers and 20 books in the wireless field, including *Wireless Communications: Principles & Practice* (translated into seven languages), *Principles of Communication Systems Simulation with Wireless Applications*, and *Smart Antennas for Wireless Communications: IS-95 and Third Generation CDMA Applications*. His latest book, *Millimeter Wave Wireless Communications*, will be released in spring 2014.

Rappaport received BS, MS, and PhD degrees in electrical engineering from Purdue University in 1982, 1984 and 1987, respectively, and is a Distinguished Engineering Alumnus of his alma mater.

Wednesday, 11 June 2014
11:00 – 12:30

Advanced Technologies for Disaster-Resilient Networks

Moderator: **Nei Kato**, Professor, Tohoku University

Speakers:

Yoshiaki Nemoto, Director, Resilient ICT Research Center, NiCT
Hiroshi Kumagai, Vice Director, Resilient ICT Research Center, NiCT
Atsushi Takahara, Executive Director, NTT Network Innovation Laboratories
Fumiyuki Adachi, Professor, Tohoku University
Noriharu Suematu, Professor, Tohoku University

Wednesday, 11 June 2014
14:30 – 16:00

Immersive and 3D Multimedia

Moderator: **Daniel Austin**, Head of Research, Smart Services Cooperative Research Centre

Speakers:

Matthew Farrelly, VR Technical Manager, Mines Rescue
Anthony Collins, Product Leader, Cruiser Interactive

Wednesday, 11 June 2014
16:30 – 18:30

5G – Global Initiatives and Spectrum

Moderator: **Kyungwhoon Cheun**, Senior Vice President, Head of Communications Research Team, DMC R&D Center, Samsung Electronics Co., Ltd.

Speakers:

Youngnam Han, Professor, KAIST;
Head of Steering Committee, 5G Forum
Takehiro Nakamura, Director, Radio Access Network Development Department, NTT DoCoMo, Inc.; Leader of IMT-Partnership Group, ARIB and ARIB 2020 & Beyond Ad Hoc
Xiaohu You, Professor, Southeast University;
5G Expert Group of 863 Plan / IMT-2020 Promotion Group / FuTURE FORUM
Sun Lixin, Director, Huawei Technologies;
WG Chair, ITU-R WP5D Technology WG / AWG
Eric Dahlman, Senior Expert, Radio Access, Technologies, Ericsson Research
Philipp Deibert, General Manager NGMN Alliance

Thursday, 12 June 2014
09:00 – 10:30

Green ICT

Moderator: **Charles Despins**, President & CEO, Prompt inc.

Speakers:

Kerry Hinton, Principal Research Fellow; Director, Centre for Energy Efficient Telecommunications, University of Melbourne
Pierre Boucher, Director, Research, Ericsson
Mohamed Cheriet, Canada Research Chair, Sustainable and Smart Eco-Cloud; Director, Synchromedia Lab, University of Quebec (ETS)
Steve Collier, Director, Smart Grid Strategies, Milsoft Utility Solutions

Thursday, 12 June 2014
14:00 – 15:30

Intelligent Transport Systems

Moderator: **Glenn Geers**, Technology Director, Infrastructure Transport & Logistics, National ICT Australia

Speakers:

John Wall, Centre for Road Safety, Transport for NSW
Stuart Ballingall, Austroads DSRC Project Director
Alex Grant, University of South Australia

Thursday, 12 June 2014
16:00 – 17:30

Path from Research to Industry

Moderator: **Daniel Austin**, Head of Research, Smart Services Cooperative Research Centre

Speakers:

Dean Gingell, Principal, Lens10 Pty Ltd
Paul McCarthy, Director, Strategy & Innovation, Sirca Group Ltd
Jeremy Brun, Staff Software Engineer, Dolby Australia
Khimji Vaghjiani, Business Advisor, NSW Department of Trade and Investment

Friday, 13 June 2014
14:00 – 15:30

Wireless Backhuls for Future Broadband Networks

Moderator: **Jay Guo**, Professor, CSIRO

Speakers:

Woo-Jin Byun, Director, ETRI, Microwave Technology Research Section
Xiaojing Huang, CSIRO
Monisha Ghosh, InterDigital

The Technical Symposia will feature 987 peer-reviewed papers on current research and development organized into the following 12 Symposia consisting of 180 oral and interactive sessions.

AHSN: Ad Hoc and Sensor Networking Symposium
CISS: Communications and Information Systems Security Symposium
CQRM: Communications QoS, Reliability and Modeling Symposium
CRN: Cognitive Radio and Networks Symposium
CSSMA: Communication Software, Services and Multimedia Applications Symposium
CT: Communication Theory Symposium
MWN: Mobile and Wireless Networking Symposium
NGN: Next-Generation Networking Symposium
ONS: Optical Networks and Systems Symposium
SAC-ANS: Selected Area - Access Networks and Systems
SAC-CC: Selected Area - Cloud Computing

SAC-CSG: Selected Area - Communications for the Smart Grid
SA-DS: Selected Area - Data Storage
SAC-EH: Selected Area - e-Health
SAC-GCC: Selected Area - Green Communications and Computing
SAC-IoT: Selected Area - Internet of Things
SAC-NMQ: Selected Area - Nanoscale, Molecular, and Quantum Networking
SAC-SSC: Selected Area - Satellite and Space Communication
SAC-SN: Social Networking
SAC-P: Selected Areas in Communications - Interactive Sessions
SPC: Signal Processing for Communications Symposium
WCS: Wireless Communications Symposium

Wednesday, 11 June 2014

Wednesday, 11 June 2014 • 11:00 – 12:30

AHSN-01: Wireless Sensor Networks I
AHSN-04: Cooperative Networking
CISS-01: Security of Cyber-physical Systems
CQRM-01: Performance Analysis
CRN-01: Spectrum Sensing I
CSSMA-01: Video Services and QoE/QoS Management I
CT-01: Network Information Theory, Network Coding I
MWN-01: Device-to-Device Communications
MWN-04: Multimedia Communications
NGN-01: Cloud Networking
OSN-01: Optical Networking
SAC-CC-01: Cloud Resource Management
SAC-GCC-01: Energy Efficient Wireless I
SPC-01: Cognitive Radio
WCS-01: Cooperative Communications - Uplink and Resource Management
WCS-04: Massive MIMO I
WCS-07: Relaying I
WCS-10: mmWave and UWB I

Interactive Sessions:

AHSN-P1: Performance Evaluation I
CISS-P1: Special Topics on Security I

Wednesday, 11 June 2014 • 14:30 – 16:00

AHSN-02: Mobile and Vehicular Ad Hoc Networks I
AHSN-05: Localization I
CISS-02: Trust Models, Management and Certificate Handling
CQRM-02: Quality of Experience Study
CRN-2: Spectrum Sensing II
CT-02: Radio Resource Management
CT-03: Network Information Theory, Network Coding II
MWN-02: Security, Privacy and Trust
MWN-05: LTE Networks I
NGN-02: Network Virtualization
SAC-EH-01: e-Health I
SAC-GCC-02: Energy Efficient Wireless II
SAC-SSC-01: Satellite and Space Networking
SPC-02: Channel Estimation, Equalization and Modeling
WCS-02: Heterogeneous Networks I
WCS-05: MIMO I
WCS-08: Spectrum Sensing and Cognitive Networks I
WCS-11: Energy Efficient Communications

Interactive Sessions:

NGN-P1: NGN Interactive Presentations
SAC-P1: Selected Areas in Communications - Interactive Presentations I

Wednesday, 11 June 2014 • 16:30 – 18:00

AHSN-03: Energy-Efficient Networks I
CISS-03: Security in Wired Systems and Optical Networks
CISS-04: Cryptography and Evaluation
CQRM-03: Energy Efficient Communications
CRN-3: Spectrum Access
CSSMA-02: Video Services and QoE/QoS Management II
CT-04: Network Information Theory, Network Coding III
MWN-03: Access Control
MWN-06: Energy Efficiency
NGN-03: Software Defined Networks
ONS-02: Resource Allocation
SAC-CSG-01: Routing, Resource Allocation and Models
SAC-GCC-03: Green Core Networks
SAC-SN-01: Networking and Security
SPC-03: Signal Detection and Synchronization
WCS-03: Routing and Scheduling
WCS-06: Relaying: Non-regenerative Relaying
WCS-09: Estimation and Detection I

Interactive Sessions:

WCS-P1: Recent Advances in MIMO and OFDM
MWN-P1: Mobile Wireless Networking Interactive Presentations I

Thursday, 12 June 2014

Thursday, 12 June 2014 • 09:00 – 10:30

AHSN-06: Cognitive Wireless Networks
 AHSN-09: Localization II
 CISS-05: Anonymity, Anonymous Communication, Metrics and their Performance Analysis
 CQRM-04: Network Routing and Planning
 CRN-4: CRN PHY I
 CSSMA-03: Mobile/Web Services and Network Management
 CT-05: Communication Theory in Ad-Hoc and Sensor Networks
 MWN-07: Mobile Social Networks
 MWN-11: LTE Networks II
 NGN-04: Cloud Architectures
 ONS-03: Visible Light Communications
 SAC-CC-02: Cloud Security and Privacy
 SAC-GCC-04: Energy Efficient Resource Allocation for MIMO
 SPC-04: Cooperative Signal Processing I
 WCS-12: Cooperative Communications - Transmission Technologies
 WCS-15: Massive MIMO II
 WCS-18: Modulation and Coding
 WCS-21: Device-to-Device Communications

Interactive Sessions:

CQRM-P1: CQRM Interactive Presentations
 CRN-P1: Cognitive Radio and Networks Interactive Presentations

Thursday, 12 June 2014 • 14:00 – 15:30

AHSN-07: Energy-Efficient Networks II
 AHSN-10: Wireless Network Applications
 CISS-06: Cloud and Distributed Application Security
 CQRM-05: Efficient Transport Protocols
 CT-06: Iterative Techniques, Detection and Decoding I
 MWN-08: Game Theory
 MWN-12: Vehicular Networks I
 NGN-05: P2P Networks and Applications
 SAC-IoT-01: Internet of Things
 SAC-ANS-01: Broadband Access
 SAC-DS-01: Data Storage
 SAC-SN-02: Recommendation and Influence
 SPC-05: Massive MIMO
 SPC-06: Cooperative Signal Processing II
 WCS-13: Heterogeneous Networks II
 WCS-16: MIMO II
 WCS-19: Spectrum Sensing and Cognitive Networks II
 WCS-22: Energy Harvesting and Energy Efficiency

Interactive Sessions:

CT-P1: Communication Theory Interactive Presentations
 ONS-P1: Optical Networks and Systems

Thursday, 12 June 2014 • 16:00 – 17:30

AHSN-08: Mobile and Vehicular Ad Hoc Networks II
 CISS-07: Formal Trust Models, Security Modeling and Protocol Design
 CISS-08: Botnet Detection, Prevention, and Defense
 CQRM-06: Resource Allocation and Performance
 CRN-5: CRN PHY II
 CSSMA-04: Congestion Control and Optimized Routing Schemes
 CT-07: Iterative Techniques, Detection and Decoding II
 MWN-09: Localization
 MWN-10: Cellular Networks
 MWN-13: Wireless Relay Networks
 NGN-06: LTE and Virtualization
 ONS-04: Free Space Optical Systems
 SAC-GCC-05: Energy Efficient Resource Allocation for OFDM
 SAC-NMQ-01: Molecular Communication and Networking
 SPC-07: Compressive Sensing and Compressive Sampling
 WCS-14: Physical Layer Security
 WCS-17: Relaying: Regenerative Relaying
 WCS-20: mmWave and UWB I

Interactive Sessions:

SPC-P1: Topics in Signal Processing in Communication and Other Emerging Systems
 WCS-P2: D2D Communications and Resource Management

Friday, 13 June 2014

Friday, 13 June 2014 • 09:00 – 10:30

AHSN-11: Wireless Sensor Networks II
AHSN-14: Scheduling
CISS-09: Computer and Network Forensics
CQRM-07: Network Tomography and Access Technologies
CRN-6: CRN PHY/MAC Session
CSSMA-05: Service Security, Privacy and Authentication
CT-08: Multiple-Input Multiple-Output (MIMO) Communications
MWN-14: Small Cell Networks
MWN-17: Vehicular Networks II
NGN-07: Information-Centric Networks
ONS-05: Scheduling, Switching and Signal Performance
SAC-CC-03: Data Center Networking
SAC-GCC-06: Green Wireless Cellular Deployment
SPC-08: SIMO and MIMO Systems I
WCS-23: Cooperative Communications
WCS-26: MIMO III
WCS-29: Estimation and Detection II
WCS-32: Vehicular Communications

Interactive Sessions:

AHSN-P2: Performance Evaluation II
CISS-P2: Special Topics on Security II

Friday, 13 June 2014 • 14:00 – 15:30

AHSN-12: Clustering
AHSN-15: Relay and Network Coding
CISS-10: Privacy and Privacy Enhancing Technologies
CISS-12: Network Security Metrics and their Performance Evaluation
CQRM-08: Multimedia and QoS Provisioning
CRN-7: CRN Application Layer I
CT-09: Physical-Layer Security
MWN-15: Modeling and Performance Analysis
MWN-18: Wireless Mesh Networks
NGN-08: Transport Protocols and Routing
SAC-GCC-07: Wireless Energy Harvesting
SAC-SN-03: Clustering and Matching
SPC-09: OFDM and Multi-carrier Systems
SPC-10: Adaptive Antennas and Beamforming
WCS-24: Body Area Networks
WCS-27: Cooperative Relaying
WCS-30: Interference Management
WCS-33: Performance Analysis

Interactive Sessions:

CSSMA-P1: Communication Services and Video Applications
SAC-P2: Selected Areas in Communications - Interactive Presentations II

Friday, 13 June 2014 • 16:00 – 17:30

AHSN-13: Security
AHSN-16: Mobile and Vehicular Ad Hoc Networks III
CISS-11: Mobile and Wireless Network Security
CQRM-09: Cloud-based Services and Architectures
CRN-8: CRN Application Layer II
CT-10: Orthogonal Frequency Division Multiplexing (OFDM)
MWN-16: Routing in Wireless Networks
MWN-19: Wireless Scheduling
NGN-09: Mobile and Wireless Networks
SAC-CC-04: Load and Performance Management
SAC-CSG-02: Performance, Coexistence and Implementation
SAC-EH-02: e-Health II
SAC-GCC-08: Energy Efficient Networks and Computing
SAC-SSC-02: Satellite and Space Communications
SPC-11: SIMO and MIMO Systems II
WCS-25: Network Coding
WCS-28: Relaying II
WCS-31: Wireless Channels and Propagation

Interactive Sessions:

MWN-P2: Mobile Wireless
MWN-P2: Mobile Wireless Networking Interactive Presentations II

Tuesday, 10 June 2014
09:00 – 12:30

T1: Cooperative Near-Capacity Wireless System Design

Author: Lajos Hanzo, University of Southampton, UK

The limitations of MIMOs relying on co-located array-elements are highlighted, which are circumvented by single-antenna-aided cooperative mobiles forming MIMOs having distributed antenna-elements, i.e. Virtual Antenna Arrays (VAA). Then the corresponding amplify-forward and decode-forward protocols as well as their hybrids are studied. Channel coding has to be specifically designed for the VAAs in order to prevent avalanche-like error-propagation. Hence sophisticated three-stage-concatenated iterative channel coding schemes are proposed and it is argued that in the absence of accurate channel information at the relays the best way forward might be to use multiple-symbol differential detection. Indeed, it is rather unrealistic to expect that an altruistically relaying handset would also accurately estimate the source-relay channel for the sake of high-integrity coherent detection. Finally, radical EXIT-chart-aided designs are used for creating near-capacity solutions and a range of future research directions as well as open problems are stated.

Tuesday, 10 June 2014
09:00 – 12:30

T2: Greening Core, Data Centre and Content Distribution Networks

Author: Jaafar Elmirghani, University of Leeds, UK

Recent studies show that the ICT industry is responsible for approximately 2% of the global CO₂ emission and this percentage is predicted to continue increasing as the Internet expands in capacity and reach. In this tutorial we will introduce measures that can be used to reduce the power consumption of the Internet. Mixed integer linear programming (MILP) network optimization will be introduced in a short tutorial on MILP and building on this and heuristics inspired by it to explore a number of energy and carbon footprint reduction measures including (i) Optimum use of time varying renewable energy in core networks (ii) Physical topology design considering operational and embodied energies (iii) Elastic optical networks using mixed line rates and optical OFDM (iv) Optimum resource allocation and green network design with data centres (v) Dynamic energy-efficient content caching (vi) Energy-efficient peer-to-peer content distribution (vii) Energy-efficient distributed clouds (viii) Energy-efficient network virtualisation.

Tuesday, 10 June 2014
09:00 – 12:30

T3: M2M Communications and Next Generation Global IoT

Authors: Abd-Elhamid M. Taha, Alfaisal University, Saudi Arabia

Najah A. Abu Ali, UAEU, UAE

Hossam S. Hassanein, Queen's University, Canada

The vision for the Internet of Things (IoT) has come a long way. From an evolution of RFID-based architectures, to an extensive interconnection of a massive number and a wide mix of machines and devices, the vision continues to evolve. Looking beyond current realizations, however, the progress of IoT faces some key inevitable challenges. This tutorial will offer a structured view of IoT, considering both its current state and its future outlook. It will start by emphasizing a working definition and a holistic architecture for IoT that is faithful to most recent visions. It then will review the foundations of IoT, elaborating on five main elements: machine and device heterogeneity; network management; localization; information-centricity; and security. In offering this review, the tutorial will highlight outstanding key challenges to be overcome. Finally, the tutorial will conclude with a brief note on the need for more capable modelling and analysis techniques to enable next generation IoT.

Tuesday, 10 June 2014
09:00 – 12:30

T4: Network Coding: From Theory to Practice

Authors: Frank H.P. Fitzek, Aalborg University, Denmark

Muriel Médard, MIT, USA

The tutorial will provide an introduction to the rapidly growing research area of network coding focusing on use cases such as communication networks and distributed storage. Network coding allows intermediate nodes in a network to manipulate data, for example by sending out packets that are combinations of previously received packets instead of simply forwarding them. For most practical purposes, these manipulations are linear operations over elements of a finite field. The initial theoretical results on network coding were followed by a wealth of applications in a number of different areas that show that the theoretical insights can be translated into practical gains. The overall goal is to familiarize the audience with the potential of network coding for different application fields and show first implementations. Tools for implementation and simulation are presented.

Tuesday, 10 June 2014
09:00 – 12:30

T5: Small Cells: Capacity, Mobility and Energy Efficiency Perspectives

Authors: **Muhammad Zeeshan Shakir**, Texas A&M University, Qatar
David López-Pérez, Bell Labs Alcatel-Lucent, Ireland
Muhammad Ali Imran, University of Surrey, UK
Khalid A. Qaraqe, Texas A&M University, Qatar, USA

Heterogeneous small-cell networks (HetSNets) are considered as a striking solution to the challenging demands such as high spectral and energy efficiency of mobile networks. HetSNets are typically composed of multiple low-power, low-cost user/operator deployed small-cells complementing the existing network. Inspired by the attractive features and potential advantages of HetSNets, their developments have gained much momentum in wireless industry and research communities during the past few years. However, HetSNets also come with their own challenges in terms of network architecture, capacity expectations, interference and mobility management, and energy consumption. This tutorial will identify the technical challenges that still need to be addressed for the successful rollout and operation of HetSNets. Specifically, this tutorial will provide answers for the following:

- What are the interference and mobility management enhancements proposed for HetSNets?
- What are the Green competitive technologies to enhance HetSNets?
- What are the economic and ecological impacts of HetSNets?

Tuesday, 10 June 2014
14:00 – 17:30

T6: Evolution Towards 5G Cellular Networks: A Radio Resource and Interference Management Perspective

Author: **Ekram Hossain**, University of Manitoba, Canada

The evolving fifth generation (5G) cellular wireless systems will have a multi-tier architecture consisting of macrocells, different types of licensed small cells, relays, and device-to-device (D2D) networks to serve users with different quality-of-service (QoS) requirements in a spectrum and energy-efficient manner. In a co-channel deployment scenario (i.e., when the different network tiers coexist in the same licensed spectrum band), the existing algorithms for radio resource and interference management (RRIM) in single-tier wireless networks will not be efficient for prioritized multi-tier networks where users in different tiers may have different priorities for channel access. This tutorial will delve into the RRIM problem in 5G multi-tier and cognitive cellular networks. Starting with the visions and requirements for 5G multi-tier cellular networks, the challenges of radio resource and interference management (e.g., power control, user association) in these networks in co-channel deployment scenarios will be outlined. Open research issues and possible approaches to tackle those issues will be described. Also, a taxonomy of the related literature addressing the different aspects of the RRIM problem will be provided highlighting the different methodologies adopted for analysis and optimization of RRIM in multi-tier cellular networks.

Tuesday, 10 June 2014
14:00 – 17:30

T7: Recent Advances in Communication Infrastructures for Smart Grid

Authors: **Rose Qingyang Hu**, Utah State University, USA
Yi Qian, University of Nebraska–Lincoln, USA

Smart grid is a term referring to the next generation power grid in which the electricity distribution and management is upgraded by incorporating advanced two-way digital technology and communication capabilities for improved control, efficiency, reliability and safety. Communication infrastructures are at the core of the smart grid as they will empower the legacy power grid with the capability of supporting two-way energy and information flow, isolating and restoring power outages more quickly, facilitating the integration of renewable energy sources into the grid and empowering the consumer with tools for optimizing their energy consumption. In this tutorial, we will present the recent advances, and standardization efforts as well as the technical challenges in smart grid communications.

Tuesday, 10 June 2014
14:00 – 17:30

T8: Erasure Coding for Cloud Communication and Storage

Authors: **Cheng Huang** and **Jin Li**, Microsoft, USA

Cloud has unleashed unprecedented opportunities for innovative services to leverage its seemingly unlimited computation and storage to offer unified experiences across all devices. Meanwhile, it is challenging to meet ever demanding requirements -- snappy responsiveness with superior quality at extremely affordable cost. Erasure coding is now being rediscovered as a crucial technology to bridge the gap. It has recently been successfully applied to a wide range of real-world applications and created significant commercial values. In this tutorial, we will introduce the basics of erasure coding and cover popular classes of erasure codes, including MDS codes, network codes and storage codes. We will walk through a wide range of applications and services -- including i) social gaming; ii) content distribution; iii) vehicle communication; iv) virtualization and consolidation; and v) cloud storage -- where erasure coding is innovatively applied to derive solutions to achieve snappy responsiveness with superior quality at extremely affordable cost.

Tuesday, 10 June 2014
14:00 – 17:30

T9: Wi-Fi Data Offloading

Author: Jianwei Huang, Chinese University of Hong Kong, Hong Kong

With the proliferation of smartphones and tablets, the demand for mobile data has been growing very rapidly, which is pushing the mobile cellular network to its capacity limit. On the other hand, the Wi-Fi technology is uniquely positioned to complement the cellular technology, due to its unlicensed nature and the worldwide adoption at home and work. In particular, Wi-Fi networks can help to offload the traffic from over-stressed cellular networks, reduce network costs and increase user satisfactions. To achieve a seamless integration of cellular and Wi-Fi technologies, however, demands forward-looking policy reforms, effective economic mechanism designs, and innovative technology solutions. This tutorial will provide an overview, both in terms of industry practice and academic research, for understanding of opportunities and challenges of designing future mobile broadband networks with integrated offloading capabilities between cellular and Wi-Fi.

Tuesday, 10 June 2014
14:00 – 17:30

T10: Participatory Wireless Networking

Authors: Panlong Yang, PLAUST, China
Xiang-Yang Li, Illinois Institute of Technology, USA

With the advantages of IOT technology and applications, wireless signals are becoming more pervasive than ever, which build potentially strong connections with mobile users. Human activities and experiences deeply affect the wireless network and should be recognized by the wireless network. Connecting human to pervasive wireless network and interplaying with them become desperately needed. In this tutorial, we will introduce the innovative wireless processing paradigm, where participants are playing an important role for pervasive IOT-based applications. This tutorial will focus on four representative applications, i.e., typical human activity recognition through WiFi and ZigBee signals, participatory sensing based wireless network information collection, coexistence of WiFi and ZigBee, and QoE (Quality of Experience) based network quality learning. These applications are participatory oriented, because human activities as well as human behaviors are considered and processed with the core of wireless network design. We will organize the state of art research and the corresponding challenges to formally address the participatory wireless processing research issues. Several innovative design concepts are also introduced with the specific wireless processing techniques.

Saturday, 14 June 2014
09:00 – 12:30

T11: OpenFlow, Software Defined Networking (SDN) and Network Function Virtualization (NFV)

Author: Raj Jain, Washington University, St. Louis, USA

Software defined networking is the latest revolution in computer networking. It enables provisioning, control, and management of thousands of physical and virtual networking devices. This is particularly helpful in public and private cloud data centers where there is a need to manage large multi-tenant networks. This tutorial is designed to provide complete insight in all aspects of SDN starting with OpenFlow which initiated the concept of SDN and other extensions particularly the OpenDaylight project which is significantly extending the applicability of SDNs. Also discussed will be the related concept of network function virtualization (NFV) and its relationship to SDN. It is assumed that the attendees have a basic understanding of traditional Ethernet and TCP/IP protocols.

Saturday, 14 June 2014
09:00 – 12:30

T12: Wireless Powered Communication: Opportunities and Challenges

Author: Rui Zhang, National University of Singapore, Singapore

Traditionally, energy-constrained wireless networks such as sensor networks are powered by batteries that have limited operation time. Wireless power transfer is thus a promising solution to provide perpetual and reliable energy supplies to wireless networks, which has recently drawn significant attention. This tutorial will provide a survey on the history of wireless power transfer and its state-of-the-art applications and enabling technologies. Then, the focus will be on the far-field wireless power transfer enabled by radio signals and its applications in wireless communication. Since radio signals carry information and energy at the same time, a unified study on simultaneous wireless information and power transfer (SWIPT) is particularly interesting. Presented will be key challenges in the optimal design of dual wireless information and power transfer networks and new solutions to tackle these challenges from various different perspectives of information/communication theory, signal processing, network architecture, resource allocation optimization and antenna/circuit design.

Saturday, 14 June 2014
09:00 – 12:30

T13: Revisit the Cellular: A Hyper-cellular Framework for Green and Smart (5G) Mobile Communication Systems

Author: Zhisheng Niu, Tsinghua University, China

Next-generation (5G) mobile networks are expected to provide 10-fold more capacity than 4G networks with the limited spectrum and energy resources. To deal with this challenge, proposed is a hyper-cellular network (HCN) to make cells more spectrum- and energy-efficient by adaptively changing the cell size (cell zooming) and BS working mode (active/sleep) in accordance with the dynamics of user distribution, traffic characteristics, and QoS requirements. The key idea is to decouple the coverage of control signals from the coverage of data services so that the data (small) cells can be adjusted on-demand without concerns of network coverage. This can be considered as one of the promising technologies for 5G. Preliminary results have shown that this new paradigm has a great potential in capacity enhancement and energy savings. A framework called TANGO (Traffic-Aware Network planning and Green Operation) has also been proposed to demonstrate the effectiveness and efficiency of HCN.

Saturday, 14 June 2014
09:00 – 12:30

T14: Visible Light Communication in the Intelligent Transportation System

Author: Navin Kumar, Amrita University, India

Visible light communication (VLC) is an emerging technology with plenty of prospective applications (yet to be explored) in both indoor and outdoor environments. Being a cost effective system, light emitting diode (LED) based VLC enjoys license-free and unregulated spectrum, very high bandwidth, harmless to human eyes and no interference with widely deployed radio frequency (RF) based systems. Though very challenging, VLC supports novel applications of road safety in intelligent transportation systems (ITS). Many access technologies are to be incorporated to achieve the objectives of ITS design. This tutorial will present the application of VLC technology in ITS. Various scenarios in which VLC can be incorporated in the vehicular technology are included. A case study with prototype design and experimental results will also be discussed. The highlights of the recent progress towards ITS featuring VLC will also be presented. In addition, challenges being encountered in the implementation and design will be highlighted.

Saturday, 14 June 2014
09:00 – 12:30

T15: Game-Theoretic Methods for Device-to-Device Communications

Authors: Lingyang Song, Peking University, China
Zhu Han, University of Houston, USA

Mobile data traffic, especially mobile video traffic, has dramatically increased in recent years with the emergence of smart phones, tablets, and various new applications. It is hence crucial to increase network capacity to accommodate these bandwidth consuming applications and services. D2D communication, which has been listed in 3GPP as a study item, is a promising concept to improve user experiences and resource utilization in cellular networks, both for licensed and unlicensed spectrum. Specifically, the mobile devices can either compete or cooperate with each other to reuse the radio resources so that either an individual or a group objective can be achieved. Game theory, a mathematical tool to study interaction among rational entities, can be employed to model and analyze individual or group behavior of nodes for allocating radio resources in wireless networks. Meanwhile, game models can provide distributed solutions to the resource allocation problems, which are based on the theoretical foundations. This tutorial provides the basic concepts/theories for addressing research advances that enable D2D communications in cellular networks, the state-of-the-art of research and development and the related information using the game-theoretic models.

Saturday, 14 June 2014
14:00 – 17:30

T16: Distributed Mobility Management for Future Internet

Author: H. Anthony Chan, Huawei Technologies, USA

The cellular networks, which are currently serving 5 billion cellular phones and mobile devices globally, have employed centralized control with different network functions arranged in a hierarchy. As the cellular networks converge with the Internet and may become more flattened (i.e., less hierarchical), the needed mobility management functions are expected to be distributed rather than centralized. Despite the large amount of standards work in Internet mobility in IETF primarily with centralized mobility, the deployment in the Internet is still slow. Such a fundamental change to distributed mobility is needed in the mobile Internet. Mobility management with centralized mobility anchoring in existing hierarchical mobile networks is quite prone to suboptimal routing and issues related to scalability. Centralized functions present a single point of failure, and inevitably introduce longer delays and higher signaling loads for network operations related to mobility management. To make matters worse, there are numerous variants of Mobile IP in addition to other protocols standardized outside the IETF, making it much more difficult to create economical and interoperable solutions. The existing mobility management standards in IETF, the issues of mobility management for the future mobile Internet, the trend of the mobile Internet and the proposed distributed mobility at IETF are explained.

Saturday, 14 June 2014
14:00 – 17:30

T17: Blind Signal Identification for Emerging Intelligent Radio Systems: Classical Approaches and New Trends

Author: Octavia A. Dobre, Memorial University of Newfoundland, Canada

Blind signal identification (BSiGI) for military communications has been intensively studied for many years. While investigations were initially carried out for applications to electronic warfare and spectrum monitoring and surveillance, recently, intensive interest on BSiGI has been shown from the wider research community, owing to the emergence of software defined and cognitive radios in the wireless world. The transition from military to commercial applications is very exciting, as incorporating intelligence into radios is expected to have significant economical, social, and environmental impacts. It simply represents an idea whose time has come. This tutorial will provide an introduction to BSiGI intelligent techniques, presenting main approaches, challenges, as well as new trends. It is designed for an audience coming from both military and commercial communications background.

Saturday, 14 June 2014
14:00 – 17:30

T18: Designing Intelligent Energy Harvesting Communication Networks

Author: Deniz Gündüz, Imperial College London, UK
Michele Zorzi, University of Padova, Italy

Energy harvesting (EH) devices are increasingly replacing their traditional, battery-operated counterparts in practice, when factors such as the sheer number of nodes or inaccessibility render battery replacement difficult and cost-prohibitive. In contrast to battery-operated systems, where minimizing energy consumption is crucial, in EH-powered networks, objective is the intelligent management of the limited harvested energy to ensure long-term, uninterrupted operation. This tutorial will provide a comprehensive overview of recent developments in the design of EH communication systems. We focus on analytical models that capture the main challenges: the intermittent nature of harvested energy, limited capacity and energy leakage in storage devices, and the constraints on device size and complexity. We will employ tools from communication theory, Markov decision processes and learning theory, to characterize optimal policies, as well as to evaluate the performance of low-complexity, near-optimal alternatives. The tutorial will examine in detail point-to-point as well as multi-user networks.

Saturday, 14 June 2014
14:00 – 17:30

T19: Data Center Networking

Author: Malathi Veeraraghavan, University of Virginia, USA

Data center networks are of increasing importance in the Internet. In addition to cloud computing, a number of basic Internet applications rely on data-center servers. To reduce Web page response times, CDN services use data center servers to store replicas for user proximity. Application service providers that offer email, document sharing, and social networking services rely on data-center servers. There is a rich set of research challenges in designing and operating large-scale, energy-efficient data center networks, each connecting up to 1 million servers. Traffic patterns of Hadoop applications, VM migration, high-performance parallel file systems, and bulk-data movement need to be considered in designing data center networks. This tutorial will present deployed and research architectures such as fat trees, SEATTLE, PortLand, DCell, BCube, optical interconnects such as HELIOS, a wireless solution, and energy-efficient designs. Industry standards such as IETF TRILL, IETF 802.1Q, and data center bridging will also be covered.

Saturday, 14 June 2014
14:00 – 17:30

T20: Optimal Resource Management for Future Cellular and Heterogeneous Networks

Authors: Emil Björnson, Supélec, Sweden
Eduard Jorswieck, TU Dresden, Germany

Future networks need to improve greatly in terms of spectral and energy efficiency. The key to fulfilling these ambitious and conflicting goals is resource management; how the time, frequency, power, and spatial resources are divided among the users. This tutorial presents a new resource management framework for joint modeling, analysis, and optimization of arbitrary cellular scenarios; e.g., clustered joint transmission, heterogeneous soft-cell deployments, cognitive radio, and spectrum sharing between operators. Using this framework, the first part of the tutorial will provide a thorough foundation to resource management from a multi-objective optimization perspective. We will explain by simple examples what makes resource management difficult in modern multi-antenna systems and present a pragmatic solution that focuses on low complexity. The second part of the tutorial will describe recent breakthroughs in resource management for cellular and heterogeneous networks: modeling and optimization of energy efficiency, distributed implementation, load balancing, and game theory that solves shared spectrum problems.

Tuesday, 10 June 2014 • 09:00 – 17:30

W1: Wireless Physical Layer Security (WPLS)**Chairs:** Eduard Jorswieck, TU Dresden, Germany**Zhu Han**, University of Houston, USA**Walid Saad**, University of Miami, USA**Xiangyun Zhou**, Australian National University, Australia

The emergence of large-scale, dynamic, and decentralized wireless networks imposes new challenges on classical security measures such as cryptography. To this end, researchers have been seeking new solutions to complement cryptography and significantly improve the overall security of wireless communication networks. One of the most promising ideas is to exploit the physical layer characteristics of the wireless channel such as fading or noise, which are traditionally seen as impediments, for improving the confidentiality of the legitimate communication links. This emerging security technique, known as physical layer security, has drawn considerable attention in the past few years. Beyond securing wireless transmissions of confidential information, physical layer security solutions have been also exploited to provide or enhance the authentication and privacy of legitimate wireless users. This workshop will bring together academic and industrial researchers in an effort to identify and discuss the major technical challenges and recent results related to physical layer security in wireless networks.

W2: Recent Advances in Uncoordinated Multiple Access Protocols (MASSAP)**Chairs:** Anthony Ephremides, University of Maryland, USA**Gianluigi Liva**, German Aerospace Center Germany**Enrico Paolini**, CNIT, DEI, University of Bologna, Italy**Petar Popovski**, Aalborg University, Denmark**Christian Schlegel**, Dalhousie University, Canada**Michele Zorzi**, University of Padova, Italy

Uncoordinated Multiple-Access Protocols, with Random Access Protocols as the best-known class of such protocols, represent a key element of wired and wireless communications systems where a potentially large population of users' needs to transmit over a shared communication medium. The role of access protocols is especially relevant for systems that feature sporadic and unpredictable access activity, and/or support delay-critical applications, such as interactive satellite communications, real-time machine-type communication, etc. While traditional random access protocols treat collisions as a waste and therefore are designed to avoid them, in recent years several innovative developments have been proposed, such as physical layer network coding and various techniques based on successive interference cancellation (SIC), where interference is instead embraced and creatively utilized. These developments have opened a completely new perspective in uncoordinated protocols, paving the way to dramatic performance improvements, and rendering the throughput of random access channels competitive with respect to that of typical coordinated protocols. Besides the performance improvement, these new approaches created a new conceptual relation with error control codes, thereby opening fundamentally new problems for two rather separated research communities. Finally, low-complexity spectral-efficient random access protocols may completely change the way scheduled and random access are supported in future standards.

The goal of this workshop is to stimulate new contributions to the topic, with emphasis on cross-layer interactions between the MAC and PHY layers of the protocol stack, as well as on the connections to coding theory.

W3: Small Cell and 5G Networks (SmallNets)**Chairs:** Mehdi Bennis, CWC, University of Oulu, Finland**Giuseppe Caire**, University of Southern California, USA**Merouane Debbah**, SUPELEC, France**Walid Saad**, University of Miami, USA

The demand for high-speed, pervasive wireless access is expected to grow significantly in the foreseeable future with the proliferation of novel resource demanding applications such as gaming, mobile TV, or social networking. The emergence of these new services imposes stringent quality-of-service requirements on the next generation of 5G wireless networks. This has urged operators to examine new ways for improving their coverage, boosting their capacity, and lowering their per bit expenditures. One promising approach is via the viral deployment of Small Cell Networks (SCNs) which include microcells, picocells, metacells, and femtocells, as well as advanced relays and distributed antennas. SCNs are envisioned to enable 5G networks to deliver high quality wireless services to homes, enterprises, or urban hotspots. The goal of this workshop is to bring together academic and industrial researchers in an effort to identify and discuss the major challenges and recent results pertaining to 5G small cell networks.

W4: Communications in Underground and Confined Environments (Underground)**Chairs:** Charles Despins, Prompt Inc., Canada**Paul Fortier**, Laval University, Canada**Michel Misson**, Clermont University, France

Truly ubiquitous wireless communications are often described as the next telecom frontier. Wireless technology can be a major lever to improve the mining industry's competitive edge and to enhance operational safety. Furthermore, the increasing level of automation in underground mining operations will bring a myriad of electronic devices. In other confined environment situations, e.g. military operations in caverns, electronic devices can yield a significant tactical advantage. In order to maximize such benefits, networked communications between these electronic devices are required to share the huge amount of data processed by the individual units, for which fast and wireless connection is also a necessity. This workshop is a forum for academic researchers, professionals and industrial specialists that are interested in or have realized original research, innovative applications, or field trials related to telecommunications in a confined area (basement, vehicle) or an underground environment (e.g. underground city, tunnels, subway, mine, shelter).

Tuesday, 10 June 2014 • 09:00 – 17:30

W5: Secure Networking and Forensic Computing (SNFC)

Chairs: Sherman Shen, University of Waterloo, Canada

Xiaodong Lin, UOIT, Canada

Sushmita Ruj, Indian Statistical Institute, India

Rongxing Lu, Nanyang Technological University, Singapore

Mirosław Kutylowski, Wrocław University of Technology, Poland

The swift advancement and wide deployment of emerging ubiquitous networking and distributed computing have revolutionized human's lifestyles by providing the best convenience and flexibility ever in accessing the Internet services and various types of personal communication applications. In spite of numerous value-added application scenarios, ubiquitous networking and distributed computing have brought challenging security, privacy and trust concerns on an unprecedented scale since computing and communication devices are expected to be connected widely and information is meant to be available pervasively in current cyber-physical world. Moreover, the digital age has also given rise to digital crime where criminals use digital devices in the commission of unlawful activities like hacking, identity theft, embezzlement, child pornography, theft of trade secrets, etc. Increasingly, digital devices like computers, cell phones, cameras, etc. are found at crime scenes during a criminal investigation. Consequently, there is a growing need for investigators to search digital devices for data evidence including emails, photos, video, text messages, transaction log files, etc. that can assist in the reconstruction of a crime and identification of the perpetrator. It has led to the emergence of a New Research Field termed "forensic computing", which investigates digital evidence found in computers and digital storage mediums in a legally admissible manner. The goal of this workshop is to provide an international forum for researchers, developers, and practitioners to demonstrate new ideas, techniques, and tools on secure and usable computers and communication networks and systems, advanced forensic techniques and methods of cybercrime investigation.

W7: M2M Communications for Next Generation IoT (M2M)

Chairs: Rath Vannithamby, Intel Labs, USA

Hung-Yu Wei and **Kwang-Cheng Chen**,

National Taiwan University, Taiwan

Anthony Rowe, Carnegie Mellon University, USA

There has been a great deal of interest in the machine-to-machine (M2M) communications and Internet-of-Things (IoT) recently. Billions of M2M devices are expected to be connected, and a major portion of them are through wireless media. M2M communication is expected to open doors for new type of applications and services that include smart metering, telemetry, surveillance, healthcare, transportation, utilities, and remote maintenance and control. These applications and services demands communication protocols that are different from the traditional communication protocols used in human-to-human networks. Research activities are ongoing in academia, and industry. M2M communication standards have been actively developed in standard bodies (e.g. ETSI TC M2M, OMA Lightweight M2M, IETF CoAP, 6LowPAN, 3GPP machine type communications (MTC), etc). The goal of this workshop is to bring various state-of-the-art research activities in academia and industry together and understand the future M2M communication requirements and potentials.

Saturday, 14 June 2014 • 09:00 – 17:30

W8: 5G Technologies (5gWS)

Chairs: Rath Vannithamby and Shilpa Talwar, Intel, USA
Andy Molisch, University of Southern California, USA
Robert W. Heath Jr., University of Texas, USA
Charlie Jianzhong Zhang, Samsung, USA
Patrick Marsch, Nokia Solutions and Networks, Poland

This workshop will present technical contributions from researchers from academia and industry on technologies for future cellular wireless networks and devices. These technologies are expected to meet the needs of an increasingly diverse set of devices and services anticipated beyond 2020, which we will refer to collectively as "5G." From end-user perspective, 5G should dramatically transform wireless service experience by offering a disruptive increase in service rate, enabling a uniform service experience anytime anywhere, and providing a high level of service quality. Also, machine-to-machine communications, e.g. for vehicular safety or industry automation, will set tough requirements on latency and reliability. Experts vary in opinion on vision and requirements for 5G, ranging from 10-100x peak rate, 1000x network capacity, 10x energy efficiency, or 10-30x lower latency. The workshop aims at bringing leaders from academia and industry to build consensus around metrics and feasible targets for 5G, and potential technology enablers.

W9: Fiber-Wireless Integrated Technologies, Systems and Networks (FWITSN)

Chairs: Thas Nirmalathas and Christina Lim, University of Melbourne, Australia
John E. Mitchell, University College London, UK
Hussein T. Mouftah, University of Ottawa, Canada
Kun Xu, Beijing University of Posts and Telecommunications, China

This workshop explores new trends that are emerging in the integration of optical fiber and wireless technology at both the system and network levels. The support of high-bandwidth and high-mobility is central to the driving vision of the network of the future. Increased pressure on the cost/bit demands high levels of network integration. A large number of technologies will need to converge, co-exist and interoperate, and most importantly, cooperate. A key area is the interplay of optical fiber networks and radio networks, to enable scalable and manageable networks without a highly complex interface structure and multiple overlaid protocols.

Sessions will cover key trends in the integration of wireless standards into novel optical architectures in particular to support high bandwidth mobile front/backhauling, the support of the emerging distributed antenna standards and techniques for enabling dynamic capacity and mobility management.

W10: Advances in Network Localization and Navigation (ANLN)

Chairs: Davide Dardari, University of Bologna, Italy
Klaus Witrisal, Graz University of Technology, Austria
Andrea Conti, ENDIF University of Ferrara, Italy
Bernard H. Fleury, Aalborg University, Denmark
Alberto Rabbachin, MIT, USA
Tony Q. S. Quek, Singapore University of Technology and Design, Singapore

The availability of accurate range/position information in indoor or dense urban environments is the key requirement for many emerging applications in the public safety, commercial, and residential domains, such as locating fire fighters or objects and instruments in warehouses, hospitals and other confined spaces. Recently a particular interest has

been devoted to simultaneously localization and mapping approaches based on machine learning techniques that take advantage of already available heterogeneous technologies to track mobile nodes.

The goal of this workshop is to disseminate advances in active and passive network localization and navigation, especially the development of new positioning algorithms based on short-range wireless technologies. The workshop will bring together academic and industrial researchers to identify and discuss technical challenges, fundamental limits, and recent solutions. The workshop will feature keynotes by Andreas Molisch, USC, and Jonathan Roberts, CSIRO.

W11: Advances in Public Safety and Emergency Communication (APSEC)

Chairs: Kandeepan Sithamparanathan, RMIT University, Australia
David Grace, University of York, UK
Tinku Rasheed, CREATE-NET Research Center, Italy
Isabelle Bucaille, Thales Communications and Security, France

Wireless communication plays an irreplaceable role in emergency and disaster relief situations. Recent events have shown that in the aftermath of an emergency, disaster or any related tremendous unexpected events, a reliable communication infrastructure plays an important role in providing critical services including emergency recovery operations, critical infrastructure restoration, post-disaster surveillance etc. Current mission-critical communication systems including PPDR (Public Protection for Disaster Relief) systems are heavily limited in terms of network capacity and coverage. While the commercial solutions and broadband data solutions are adequate for non-mission critical or auxiliary use, they are not designed for or suitable to address large scale emergency communication deployments immediately after the disaster scenarios where these networks can provide dependable and resilient network connectivity at higher data rates over large coverage areas. Further, incompatible and outdated communications equipment, as well as the overloaded commercial networks, is continually hindering public safety networks communications.

Moreover, PPDR systems are limited by interoperability barriers and the technological gap with commercial technologies and evolving standards. The APSEC workshop aims to discuss the most recent trends and technological considerations for future public safety and emergency response communications. The broad areas of interest include rapidly deployable network architectures, wireless technologies, cognitive and self-organizing communications, software-defined radio, device-to-device communications, interoperability considerations, spectrum availability and management, standardization and regulatory aspects. The workshop will bring together researchers, industry fora and relevant user community to share the future research perspectives of public safety and emergency communications and is a timely initiative given the growing importance and outreach for disaster management communication techniques and integrated solutions for public safety communications. Besides the technical insights, the workshop will encourage the participants to discuss among each other.

Saturday, 14 June 2014 • 09:00 – 17:30

W12: QoE-centric Network and Application Management (QoENAM)**Chairs: Raimund Schatz,**

FTW Telecommunications Research Centre Vienna, Austria

Martín Varela, VTT Technical Research Centre, Finland**Markus Fiedler,** BTH Blekinge Tekniska Högskola, Sweden**Luigi Atzori,** University of Cagliari, Italy**Lea Skorin-Kapov,** University of Zagreb, Croatia

Quality of Experience (QoE) is a topic that has been gaining importance in a large variety of research domains, ranging from networking to media processing to social sciences. In particular, much attention so far has been devoted to the development of methods for reliably assessing and estimating the QoE of networked media and communication services as well as to understanding how user-perceived quality actually depends on the performance of the underlying technical infrastructure.

However, being able to accurately understand, model and predict QoE is of value only if these capabilities are also properly exploited. In this respect, we witness substantial demand for applying user-centric quality concepts to real-world communication systems. While there are already some proposed solutions geared towards Quality of Experience (QoE) or Customer Experience driven network and application management in the literature, their real-world application rarely occurs. Thus, the goal of this workshop is to provide an international forum for industrial and academic researchers in order to discuss the benefits and challenges of applying the end-user perspective to the management of current and future communication networks and services.

W13: Cooperative and Cognitive Mobile Networks (CoCoNet6)**Chairs: Frank H.P. Fitzek,** Aalborg University, Denmark**Marcos D. Katz,** University of Oulu, Finland**Qi Zhang,** Aarhus University, Denmark

The scope of the CoCoNet6 workshop is to bring together a highly qualified group of people with interest in cooperative and cognitive wireless networks. Cooperation is a major subject in research in the wireless communication community as it has been identified as one of the underlying principles for future wireless communication systems. Cooperation, altruistic or non-altruistic, is the basis to break up the cellular concept and enrich it by multi hop, peer-to-peer, or cloud functionalities. The workshop will highlight the newest trends in this emerging area, complementing it with first practical implementations and demonstrations in this field. New technologies and concepts such as network coding and mobile clouds are the driving forces for cooperative and cognitive networks. Besides the technical insights, the workshop will encourage the participants to discuss among each other. The workshop is seeking papers for oral presentations and papers which will be presented in poster sessions possibly accompanied with demonstrations or test-beds.

W14: Energy Efficiency in Wireless Networks & Wireless Networks for Energy Efficiency (E2Nets)**Chairs: Raouf Boutaba,** University of Waterloo, Canada**R. Venkatesha Prasad,** TU Delft, Netherlands**Abdur Rahim,** CREATE-NET, Italy**Jinsong Wu,** Bell Laboratories, China**Martin Jacobsson,** Uppsala University, Sweden**Kandeepan Sithamparanathan,** RMIT, Australia

Reducing world-wide energy consumption and contributing to a more sustainable planet is urgent both from an economical and environmental point of views. With ICT technologies, wireless networking, the Internet of Things (IoT), and smart system, we have the opportunity to detect, prevent, and automate solutions for energy efficiency as well as creating a more sustainable society. However, for this to be a viable option, also the ICT technologies, such as wireless networking, embedded system must be energy efficient. Instead of looking at these two problems in silo, we believe in a venue for the researchers and practitioners in these two fields to come together and interact. This workshop aims to build this cooperation.

Energy Efficiency in Wireless Networks: According to the GESI study, the ICT sector contributes around two per cent of global greenhouse gas (CHG) emissions. To increase the competitiveness, energy efficiency (E2) must also be a design criterion of the network and service architectures. Flexible networks that adapt their capacity to the requirements and context can lead to significant energy savings. Novel networking paradigms, including cognitive networking approaches, need to be introduced to assure that all components are used with maximum utilization. Green network architectures will be the cross-layer, cognitive and cooperative aggregation of techniques and mechanisms to provide a communication infrastructure where the energy consumption is minimized while guaranteeing the quality/grade of service required by the applications. Along with energy efficiency, spectrum utilization is to be optimized and radiation is to be minimized. Green networking is not only the evolution of legacy networking paradigms but also the revolution of the visionary hybrid networks which is the convergence of the heterogeneous wired, wireless and ad hoc networks.

Wireless Networks for Energy Efficiency: To address the other 98 per cent of the global CHG emissions, wireless networks and the Internet of Things can be used to reduce the energy consumption of industrial/home/office environments/applications. For example, along with the research in low-carbon road transportation technologies, wireless networks can be employed to analyze the traffic jams and help navigators to find a suitable route leading energy savings.

FULL and LIMITED REGISTRATION	(On/by 9 May)	(After 9 May)
RG-01 – Full IEEE ComSoc Member	US\$ 890	US\$ 1015
RG-02 – Full IEEE Member ¹	US\$ 915	US\$ 1040
RG-03 – Limited IEEE ComSoc Member	US\$ 690	US\$ 850
RG-04 – Limited IEEE Member ¹	US\$ 720	US\$ 880
RG-05 – Full Non Member ²	US\$ 1170	US\$ 1315
RG-06 – Limited Non Member ²	US\$ 1030	US\$ 1210
ONE DAY REGISTRATION	(On/by 9 May)	(After 9 May)
RG-07 – 1 Day IEEE ComSoc Member	US\$ 515	US\$ 625
RG-08 – 1 Day IEEE Member	US\$ 545	US\$ 655
RG-09 – 1 Day Non Member	US\$ 745	US\$ 855
LIFE, STUDENT, WORKSHOP, TUTORIAL and IF&E	(On/by 9 May)	(After 9 May)
RG-10 – IEEE Life Member	US\$ 50	US\$ 50
RG-11 – IEEE Student Member (FULL TIME STUDENTS ONLY)	US\$ 310	US\$ 370
RG-12 – Student Non-Member	US\$ 370	US\$ 430
RG-13 – Workshop/Tutorial One-day pass (with conference reg.) ³	US\$ 200	US\$ 250
RG-14 – Workshop/Tutorial Two-day pass (with conference reg.) ³	US\$ 350	US\$ 400
RG-15 – Workshop/Tutorial One-day pass Only	US\$ 300	US\$ 350
RG-16 – Workshop/Tutorial Two-day pass Only	US\$ 350	US\$ 500
RG-17 – Industry Forum and Exhibition Access Only	US\$ 200	US\$ 300

1) Includes complimentary IEEE ComSoc membership (digital delivery of IEEE Communications Magazine)

2) Includes complimentary affiliate IEEE ComSoc membership (digital delivery of IEEE Communications Magazine)

2) The discount for workshop/tutorial days passes applies to full or limited conference registrations (RG-01 to RG-06) and student and life member registrations (RG-10 to RG-12).

Tutorial and Workshops Registration

By purchasing a one or two day workshop/tutorial pass, you can attend any tutorial or workshop session on the selected day or both days subject to seating availability. The registration fee also includes Welcome Reception, notes and a coffee break on day of the tutorial/workshop. Please indicate which tutorial or workshop you will attend for seating allocation.

Accompanying Companion / Spouse / Significant Other

You are allowed to register only one Guest, who will receive a GUEST badge. Your Guest will not be allowed to attend any conference sessions. However, you may purchase Social Event Tickets for your Guest. Guests must not be an author or co-author. ALL GUEST REGISTRATIONS WILL BE VERIFIED FOR EVALUATION.

To register online or download the registration form,
visit <http://icc2014.ieee-icc.org/registration.html>

CONFERENCE HOTEL

488 George Street
Sydney, NSW 2000, Australia
T: 61-2-9266-2000
F: 61-2-9265-6065

Conference Hotel Rate:
AUD\$289

**Hotel Reservation
Deadline:
Thursday, 8 May 2014**

The Hilton Sydney



To reserve your accommodations, visit
<http://icc2014.ieee-icc.org/hotels.html>

COMMITTEE MEETINGS HOTEL

161 Elizabeth Street
Sydney, NSW 2000, Australia
T: 61-2-9286-6000
F: 61-2-9286-6686

Conference Hotel Rate:
AUD\$270

**Hotel Reservation
Deadline:
Tuesday, 6 May 2014**

Sheraton on the Park



IEEE ICC 2014

PATRONS & EXHIBITORS

IEEE ICC'14 PATRONS



SUPPORTERS



CONNECT WITH IEEE ICC:

