IEEE WCNC

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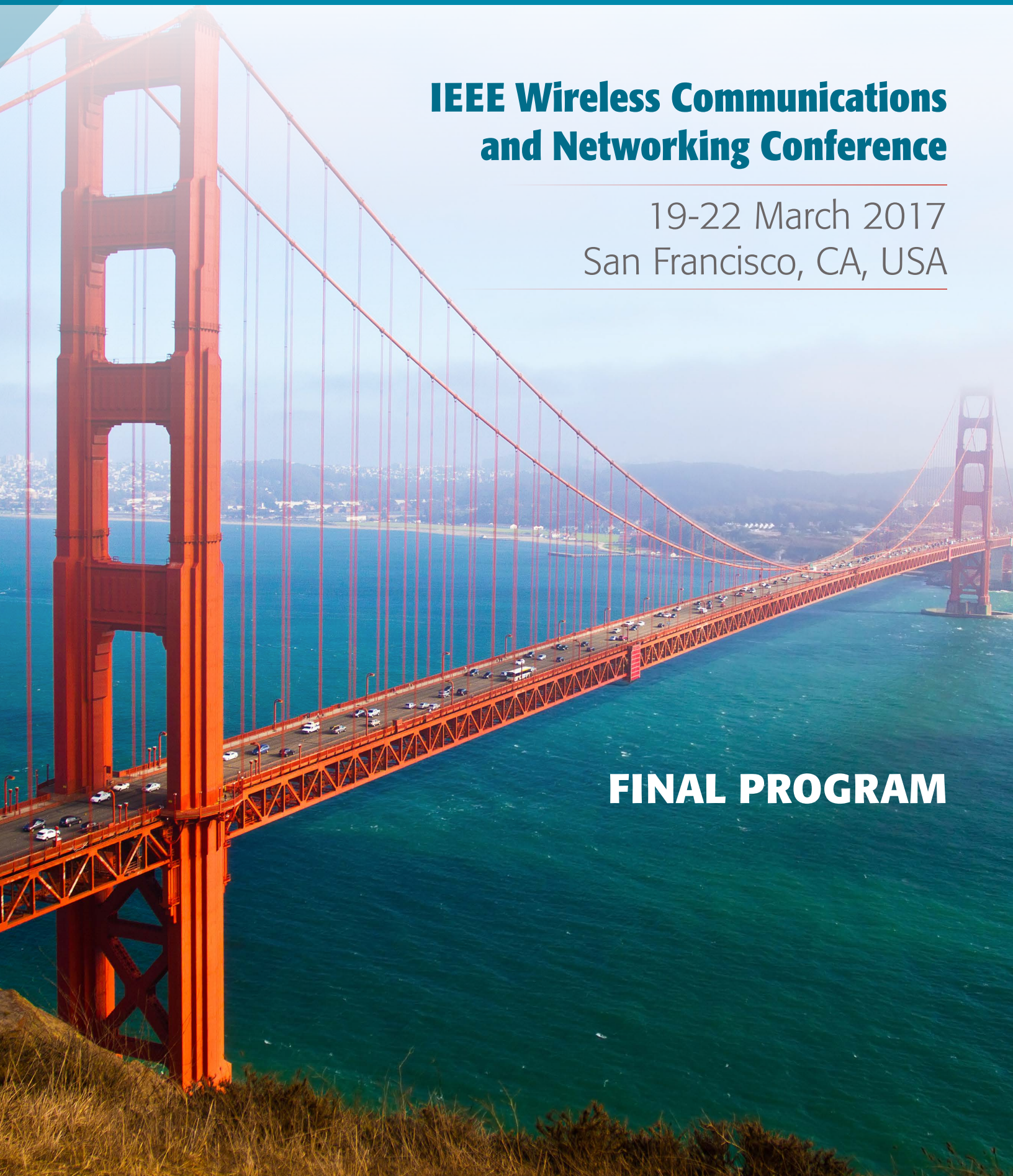

IEEE Wireless Communications and Networking Conference

19-22 March 2017
San Francisco, CA, USA

FINAL PROGRAM

WELCOME FROM THE GENERAL CHAIRS

Please accept our warmest welcome to the 2017 Wireless Communications and Networking Conference (WCNC) in the magical city of San Francisco. IEEE WCNC is the only IEEE conference focused exclusively on wireless research, technology, and applications, bringing together thought leaders from industry, academia, government agencies and other institutions to exchange information and ideas on advancing the state-of-the-art in wireless communications and networking. Our program features a dazzling array of plenary talks by luminaries in the field, nine panels on timely, important, and controversial topics as well as an industry forum highlighting the key challenges and opportunities facing the wireless industry. A large exhibit floor will showcase the latest technologies from the leading global wireless companies. In addition, IEEE WCNC'17 will feature the first-ever "Startup City," with 15 wireless startups displaying their innovative technologies and competing for the IEEE WCNC'17 "hottest wireless startup" award. We also have a rich program for students consisting of a mentoring session, poster/demo showcase, industry-student recruiting event, and industry-student networking reception. Other program elements include a networking event for IEEE Young Professionals and a lunchtime panel for Women in Communications Engineering.

This IEEE WCNC in not like any in the past. It is a bold new conference that showcases the most advanced wireless research results as well as the best wireless technology. It includes many features completely new to IEEE WCNC and, in fact, to IEEE conferences in general. We are excited to host a conference that embraces diversity of both its program and its participants. Welcome to IEEE WCNC '17 in the heart of San Francisco and Silicon Valley. We hope you enjoy the conference.

Sincerely,

IEEE WCNC 2017 General Chairs

Andrea Goldsmith
Stanford University

Katie Wilson
Santa Clara University

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EXECUTIVE COMMITTEE

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Stanford University

Katie Wilson
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GENERAL INFORMATION

Badges and Tickets
IEEE WCNC Badges must be worn at all times and are necessary for admittance to all IEEE WCNC sessions, meal functions and social events. Tickets and Badges are needed for entry to the Workshops and the Conference Banquet.

Sessions
All IEEE WCNC Sessions will take place at the Hyatt Regency San Francisco. All meeting rooms are located on the Pacific Concourse Level except the Grand Ballroom & Regency Rooms which are on the Street Level.

Registration
The IEEE WCNC Registration Desk is located on the Atrium/Lobby Level of the Hyatt Regency San Francisco.

Registration Hours

Sunday, 19 March	08:00 – 20:00
Monday, 20 March	08:00 – 18:30
Tuesday, 21 March	08:00 – 17:00
Wednesday, 22 March	08:00 – 16:30

Networking Breaks
Networking Breaks will be held on the Pacific Concourse Foyer on Sunday from 10:30 – 10:45 & 15:15 – 15:30 and in the Grand Ballrooms B&C & Foyer on Monday – Wednesday from 10:30 – 10:50 & 16:00 – 16:20.

Luncheon
Lunch (included in the conference registration) will be served Monday – Wednesday in the Atrium located on the Lobby Level.

WiFi Access
Complimentary WiFi Access will be available during conference hours.
Network SSID: WCNC 2017
Username & Password - IEEE WCNC

A Friendly Reminder
Please turn off anything that chirps, beeps, buzzes or rings, including but not limited to pagers, beepers, cell phones, PDA, laptops during the conference. The speakers and audience thank you for your consideration and cooperation.

Evaluation Form
You will receive a link to an evaluation form for any Tutorial or Workshop that you attend. All conference participants will receive an overall conference evaluation form by email after the conference. Your feedback is important to us and helps us plan future meetings.

PLENARY SPEAKERS

Monday, 20 March 2017 | 09:00 – 09:45 • Ballroom A

Matthew S. Grob
Executive Vice President & CTO
Qualcomm Technologies, Inc.

5G: What comes next?

The vision for 5G is compelling: a unifying connectivity fabric that will power an array of world-changing use cases and transform many industries. We are beyond talking about 5G vision, and well underway towards commercial network launches of the first 3GPP 5G New Radio (NR) specification – the global 5G standard. Learn about what new frontiers 5G will explore next as well as get an update on what technologies will be featured in upcoming trials, standardization and deployments of this transformational technology platform.

Biography: Matt Grob is executive vice president of Qualcomm Technologies, Inc., and chief technology officer. In this role, he is responsible for oversight of Qualcomm's technology path, coordination of R&D activities across the Company, and development of next-generation wireless and adjacent technologies. The Company's broad portfolio of research areas includes advanced cellular and unlicensed band technologies, satellite systems, semiconductor technology, computer vision, machine learning, and security technologies. In addition, Grob also oversees Qualcomm Ventures and Qualcomm Corporate Engineering Services, and he is a member of Qualcomm's executive committee.

Grob joined Qualcomm in 1991 as an engineer. His contributions include system design, standardization and project leadership for early CDMA data services; the Globalstar satellite based mobile voice and data system and later 1x EV-DO high-speed wireless Internet access technology. His focus on cellular data services led to his assignment as co-project engineer for the HDR (High Data Rate) program starting in 1997. This new high-speed Internet access technology became standardized as 1x EV-DO and was commercialized throughout the world. Innovations and techniques from these programs also helped UMTS' evolution to HSPA.

Monday, 20 March 2017 | 09:45 – 10:30 • Ballroom A

Marcus Weldon
President, Bell Labs
Corporate CTO, Nokia

The Future of All Things and the Creation of Time

This talk will explore the question of how the '5G era' will transform human existence, and the potential impact on markets, economies and society as a whole. The key technological and architectural enablers will be discussed, and predictions will be made for the future of all things (or at least some key things).

Biography: As President of Bell Labs and Corporate Chief Technology Officer, Marcus Weldon is responsible for coordinating the technical strategy across the company and driving technological and architectural innovations into the portfolio. Marcus is considered one of the luminaries in our industry in terms of the clarity, depth and breadth of his vision, and his track of picking the right technological disruptions and opportunities, from vectoring for copper access, to the evolution to LTE overlay and Small Cells, to the emergence of virtualization and SDN as profound industry changing forces and the movement towards edge cloud architectures. He combines this vision with the power of Bell Labs, to create a unique innovation engine whose goal is to 'invent the future' of the networking and communications industry.

He was selected as one of the Global Telecoms Business Power 100 of the most influential people in ICT in 2014 and one of their 'Top CTOs to watch in 2015'.
He is on the Board of Trustees of the Liberty Science Center in New Jersey and an advisor to select Venture Funds.

Monday, 20 March 2017 | 13:45 – 14:30 • Ballroom A

John Cioffi
Chairman & CEO, Assia
Professor (Emeritus), Stanford University

How Hot is your Spot?

Internet consumer quality of experience increasingly depends on connectivity to the spot of a consumer (or thing's) device. This talk will provoke thought on emerging trends in software-defined network virtualization as related to connectivity, wireless and wired, and the rise of the virtual network operator predicted. The concept of net vitality as a real driver of competition and network investment in the balance between Infrastructure Providers and Virtual Network Operators. Substantial fractions of customers receive 0-10Mbps very often even with the best latest-standard Wi-Fi access points, mobile devices, and/or fiber/copper connections that claim speeds 100x or even higher. This talk will examine some of the issues in such performance and pose some technical avenues to motivation of their productive address within the context of virtualization.

Biography: John M. Cioffi - BSEE, 1978, Illinois; PhDEE, 1984, Stanford; Bell Laboratories, 1978-1984; IBM Research, 1984-1986; EE Prof., Stanford, 1986-present, now emeritus. Cioffi founded Amati Com. Corp in 1991 (purchased by TI in 1997) and was officer/director from 1991-1997. He currently also is on the Board of Directors of ASSIA (Chairman and CEO), Alto Beam, Tinoq, and the Marconi Foundation. Cioffi's specific interests are in the area of high-performance digital transmission. Cioffi is the recipient of the IEEE's Alexander Graham Bell, Kirchmayer, and Millenium Medals (2010, 2014, and 2000); Member Internet Hall of Fame (2014); Economist Magazine 2010 Innovations Award; International Marconi Fellow (2006); Member, US National and UK Royal Academies of Engineering (2001, 2009); IEEE Kobayashi and Armstrong Awards (2001 and 2013); BBWF Lifetime Achievement (2014), IEEE Fellow (1996); IEE JJ Tomson Medal (2000); 1991 and 2007 IEEE Comm. Mag. best paper; and numerous Conference Best-Paper awards. Cioffi has published over 600 papers and holds over 100 patents, of which many are heavily licensed including key necessary patents for the international standards in ADSL, VDSL, vectored VDSL, G.fast, DSM, LTE, and various Wi-Fi methodologies.

PLENARY SPEAKERS

Tuesday, 21 March 2017 | 09:00 – 09:45 • Ballroom A

Yongxing Zhou
Vice President, Wireless Radio Access Technology
Huawei

The Future Radio Access Technologies

The new connected digital society with varieties of heterogeneous services (MBB and the IoT) provision has brought unprecedented challenges to future radio access and mobile core networks. Technology and spectrum innovations have to meet those diversified requirements for specific application scenarios within an integrated/unified radio access technology framework. This talk will illustrate the transformation from spectrum efficiency to service-specific evaluation metrics is needed. Key technology enablers will also be analyzed and evaluated to accelerate business success of 5G and the IoT.

Biography: Yongxing Zhou is Vice President of Huawei Wireless Radio Access Technology Department and Head of MIMO and Spectrum Research Competency Center. He is currently working on 3GPP LTE-Pro and 5G technologies. Prior to 2014, he headed Huawei 3GPP LTE Standardization Team and particularly led development of LTE and LTE-Advanced technologies such as MIMO, FD-MIMO, CoMP, 3D channel modeling, ePDCCH and FDD/TDD Carrier Aggregation etc. Dr. Yongxing Zhou has more than 100 issued patents. Before joining Huawei, he was with Samsung from 2002 to 2009 working on IEEE 802.22, IEEE 802.11n standard and implementations as well as TDD related research.

Tuesday, 21 March 2017 | 09:45 – 10:30 • Ballroom A

Chih-Lin I
Chief Scientist, Wireless Technologies
China Mobile

SDX: How Soft is 5G?

Driven ultimately by efficiency, the CT industry has been relying on customized platforms and special purpose equipment. Wireless and mobile systems of 1G through 4G had followed the same suit. The awareness of agility and forward compatibility needs in the 5G era, on the other hand, has shed light on the importance of being "soft" going forward. This talk will highlight the exciting and challenging journey of the deep CT+IT+DT convergence; as well as the progress of an emerging end to end SDX for 5G, threading through CN, RAN, and AI.

Biography: In 2011, she joined China Mobile as its Chief Scientist of wireless technologies, established the Green Communications Research Center, and launched the 5G Key Technologies R&D. She is spearheading major initiatives including 5G, C-RAN, high energy efficiency system architectures, technologies and devices; and green energy. She was an Area Editor of IEEE/ACM Trans. NET, an elected Board Member of IEEE ComSoc, Chair of the ComSoc Meetings and Conferences Board, and Founding Chair of the IEEE WCNC Steering Committee. She was a Professor at NCTU, an Adjunct Professor at NTU, and currently an Adjunct Professor at BUPT. She is the Chair of FuTURE 5G SIG, an Executive Board Member of GreenTouch, a Network Operator Council Founding Member of ETSI NFV, a Steering Board Member of WWRF, a member of IEEE ComSoc SDB, SPC, and CSCN-SC, and a Scientific Advisory Board Member of Singapore NRF. Her current research interests center around "Green, Soft, and Open".

Tuesday, 21 March 2017 | 13:45 – 14:30 • Ballroom A

Asha Keddy
General Manager, Next Generation & Standards
Intel Corporation

5G - Moving Towards Deployment

2017 promises to be a transitional year for 5G. Air interface and core network concepts defined both on a proprietary basis and by pre-standards forums will be deployed in trial configurations at scale. This will allow direct field performance assessment of 5G enhanced mobile broadband services at both sub-6GHz and mm-wave frequencies, and point the way towards commercial 5G deployments and services. This presentation will first assess the resulting state-of-the-art in 5G air interface design, including the technical components and schedule of the emerging 3GPP New Radio specification. The discussion will then consider, on a regional basis, the state of global 5G spectrum availability including access mechanisms and coexistence requirements before moving to assess current progress and key challenges in implementing 5G, including trends in silicon, in RF and baseband implementations in devices and radio access infrastructure, and in core network design. The talk will close with a look forward to the critical 2018-2020 period, when the world's first operational 5G systems will emerge.

Biography: Asha R. Keddy is Vice President in the Communications and Devices Group and General Manager of Next Generation and Standards at Intel Corporation. She is responsible for investigating and delivering the technologies, business use cases, collaborations and trials that will usher in the era of 5G wireless connectivity as well as broadly fostering innovation in mobile communications and ecosystem intelligence for future products. Asha is also responsible for wireless standards at Intel including 3GPP and IEEE. The organization's focus areas include designing and developing the full systems needed and also building blocks such as RF, BB ASICs, hardware, algorithms, systems, modems, early prototypes and platforms to also scale to industry verticals.

PLENARY SPEAKERS

Wednesday, 22 March 2017 | 09:00 – 09:45 • Ballroom A

Erik Ekudden
Vice President
Head, Group Technology Strategy
CTO Americas
Ericsson

Innovation in the 5G Network Platform

Over the coming 10 years, the 5G ecosystem will allow every industry to move from an unconnected physical world to a fully digitalized and mobilized situation. With 5G we will move beyond smartphones, tablets and TV into a world of the IoT, smart meters, connected cars and potentially billions of other devices in other industries. The capabilities of 5G wireless access must extend far beyond previous generations of mobile communication. Examples of these capabilities include very high data rates, very low latency, ultra-high reliability, energy efficiency and extreme device densities.

5G will provide a common network platform - one physical network with multiple logical networks on top of it - that is dynamically set up in a secure way to give industries what they need. It will be able to connect any industry with any end point, whether a device, sensor or automobile.

We'll see new as-a-service business models based on this network slicing, which, in the context of 5G, will be like virtual networks on-demand. Workloads will also move further out in the infrastructure to support new use cases that require better user experience or higher efficiency, in what we call distributed cloud.

Distributed cloud will also be key to supporting the Internet of Things, which has developed in two primary ways. The first is through miniaturization, cloud solutions, faster processing speeds, and the dawn of big data and data analytics have allowed companies to benefit from real-time data collected from the physical environment. Second, decreasing component costs and cheaper data collection methods have altered the cost-benefit model, making IoT solutions feasible for more enterprises and industries.

Biography: Erik Ekudden is CTO Americas of Ericsson and Head of Ericsson Group Technology Strategy. Since 2005, he has been responsible for Ericsson's technology strategies and industry activities. He is based in San Jose, California.

Prior to assuming his current position, Mr. Ekudden held various positions within research and development in Ericsson, including research area director and vice president of standardization. He joined Ericsson in 1993, working on mobile systems.

Wednesday, 22 March 2017 | 09:45 – 10:30 • Ballroom A

Gerhard Fettweis
Vodafone Chair Professor
TU Dresden

Challenging the Wireless Terabit/s

The data rate of wireless access technology has been increasing by 10x every 5 years. At the start of 5G it will be surpassing 1Gb/s for cellular, and 100Gb/s for WLAN access. Hence, data rates of 1Tb/s for wireless access are coming into sight. This creates the challenge of how to achieve a low-power modem solution at these ever increasing data rates. If, e.g., powered by USB or power-over-Ethernet, a modem may only have available power budget of a few Watt. However, does digital signal processing, analog/digital conversion, or the RF transceiver pose the bottleneck? It turns out that alone traditional linear modulation and Nyquist sampling leads to a required power consumption for analog/digital conversion far beyond the available budget. Do we have to re-engineer our modems? Do we need to re-invent system theory for nonlinear operations? Some first answers shall be given, showing a pathway towards the feasibility of achieving 1Tb/s wireless. Let's prepare for the 5G WLAN and 6G cellular speeds!

Biography: Gerhard P. Fettweis earned his Ph.D. under H. Meyr's supervision from RWTH Aachen in 1990. After one year at IBM Research in San Jose, CA, he moved to TCSI Inc., Berkeley, CA. Since 1994 he is Vodafone Chair Professor at TU Dresden, Germany, with 20 companies from Asia/Europe/US sponsoring his research on wireless transmission and chip design. He coordinates 2 DFG centers at TU Dresden, namely cfaed and HAEC, and the 5G Lab Germany.

Gerhard is IEEE Fellow, member of the German Academy of Sciences (Leopoldina), the German Academy of Engineering (acatech), and received multiple IEEE recognitions. In Dresden his team has spun-out fifteen start-ups, and setup funded projects in volume of close to EUR 1/2 billion. He has helped organizing IEEE conferences, most notably as TPC Chair of ICC 2009 and of TTM 2012, and as General Chair of VTC Spring 2013 and DATE 2014.

Wednesday, 22 March 2017 | 13:45 – 14:30 • Ballroom A

Eric Starkloff
Executive Vice President, Global Sales and Marketing
National Instruments

A Platform Approach to 5G

5G promises a transformation in the way industries do business and consumers live their lives with wealth of new features and capabilities compared to today's status quo. Reviewing the timeline and potential launch of 5G technologies and services, the tasks ahead coupled of the enormous complexity of the work renders traditional approaches obsolete. Any new transformation especially one of this magnitude must follow a systematic process to deliver on the promise. New approaches are needed to compress the time from concept to commercialization otherwise introductions may be delayed, investments may skyrocket, or a combination of both. NI proposes a platform based approach to speed time to market that combines an innovative approach to system design with logical and efficient transitions to the testing of these new technologies in the product development and commercialization phases. Providing innovative platform components encompassing both hardware and software for prototyping this approach can be extended to product development by reusing these components in a number of different ways to break down the conventional barriers between design and test. This approach also facilitates more active collaboration between researchers and product teams to solve tough business challenges and accelerate the path to a connected 5G landscape.

Biography: Since joining NI in 1997, Starkloff has held leadership positions across the marketing organization, including leading teams that pioneered industry adoption of systems platforms such as PXI and CompactRIO.

Starkloff invests his time in science, technology, engineering, and math (STEM) education by serving on the advisory board for the Bradley Department of Electrical and Computer Engineering at Virginia Tech and the board of directors for Urban Roots, an Austin-based sustainable agriculture program to transform the lives of young people.

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Performance Analysis of RF-FSO Multi-hop Networks
Behrooz Makki, Tommy Svensson (Chalmers University of Technology, Sweden)
Maite Brandt-Pearce (University of Virginia, USA)
Mohamed-Slim Alouini (KAUST, Saudi Arabia)

Cooperative Diversity Using Optimal Relay Power Control for Different Fading Channels
Abdurrahman Alfitouri, Khairi A. Hamdi (University of Manchester, UK)

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PHY4: Security I

Performance Bounds on the Security of Transform-ba sed Analog Encryption
Theodoros Tsiligkaridis (MIT Lincoln Laboratory, USA)

Analyzing Directional Modulation Techniques as Block Encryption Ciphers for Physical Layer Security
Abrar Ahmad, Muhammad Amin (Institute of Space Technology, Pakistan)
Muddassar Farooq (National University of Sciences & Technology, Pakistan)

Insider-Attacks on Physical-Layer Group Secret-Key Generation in Wireless Networks
J. Harshan (Advanced Digital Sciences Center, Singapore)
Sang-Yoon Chang (University of Colorado, Colorado Springs, USA)
Yih-Chun Hu (University of Illinois, Urbana-Champaign, USA)

Secret Key Generation Using One-Bit Quantized Channel State Information
Saygın Bakşi, John Snoap, Dimitrie C. Popescu (Old Dominion University, USA)

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PHY5: C-RAN I

Robust C-RAN Precoder Design for Wireless Fronthaul with Imperfect Channel State Information
Dong Wang, Ying Wang, Ruijin Sun, Xiangyang Zhang (BUPT, China)

Robust Optimization for Energy Efficiency in Multicast Downlink C-RAN
Jinghong Tan, Tony Q. S. Quek (SUTD, Singapore)
Qi He (UEST, China)

On Achievability for Downlink Cloud Radio Access Networks with Base Station Cooperation
Chien-Yi Wang (Télécom ParisTech, France)
Michele A Wigger (Telecom ParisTech, France)
Abdellatif Zaidi (Université Paris-Est Marne La Vallée, France)

Cost-Aware Fronthaul Rate Allocation to Maximize Benefit of Multi-User Reception in C-RAN
Dora Boviz, Chung Shue Chen (Bell Labs, Nokia, France)
Sheng Yang (CentraleSupelec, France)

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PHY6: Caching I

Secure Joint Cache-Channel Coding over Erasure Broadcast Channels
Sarah Kamel (Telecom ParisTech, France)
Mireille Sarkiss (CEA LIST, France)
Michele A Wigger (Telecom ParisTech, France)

Caching and Coded Multicasting in Slow Fading Environment
Mingyue Ji, Rong-Rong Chen (University of Utah, USA)

Cache-enabled Base Station Cooperation for Heterogeneous Cellular Network with Dependence
Sufeng Kuang and Nan Liu (Southeast University, China)

Centralized Coded Caching with Heterogeneous Cache Sizes
Abdelrahman Ibrahim, Ahmed A. Zewail, Aylin Yener (Penn State University, USA)

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EMG3: Content Delivery and Caching

Towards New Information Centric Networking strategy based on Software Defined Networking
Anwar Kalghoum (ENSI University, Tunisia)
Sonia Mettali Gammar (Cristal lab, ENSI Tunisia, Tunisia)

Ameliorate Half-duplex Relaying via Cooperative Caching for Content Accessing
Chang Yang, Hongjia Li (Chinese Academy of Sciences, China)

A Genetic Algorithm-based Approach for Content Delivery in Femtocaching-Assisted Networks
Michael Azmy, Karim ElAzzouni, Ahmed Abuemeira (Alexandria University, Egypt)
Mustafa ElNainay (Alexandria University; Virginia Tech, Egypt)

Resource Trading for a Small-Cell Caching System: A Contract-Theory Based Approach
Tingting Liu (Nanjing Institute of Technology, China)
Jun Li, Feng Shu (Nanjing University of Science and Technology, China)
Zhu Han (University of Houston, USA)

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EMG4: Channel and PHY

Analysis of Localization Using Multipath Characteristics as Location Fingerprint
Yuan Gao, Chang Yongyu, Bin Su (BUPT, China)
Jiantao Xue (Huawei Technologies, China)
Li Anjian (Huawei Technologies, China)

Performance Analysis of Dual-hop DF Satellite Relaying over κ-μ Shadowed Fading Channels
Jiayi Zhang, Xu Li (Beijing Jiaotong University, China)
Imran Shafique Ansari (Texas A&M University, Qatar)
Ying Liu (Beijing Jiaotong University, China)
Khalid A. Qaraqe (Texas A&M University, Qatar, USA)

Spatial Modulation for Improved Performance of Next-Generation WLAN
Ahmed G. Helmy (University of Texas, Dallas, USA)
Shahrnaz Azizi, Thomas Kenney (Intel Corporation, USA)
Naofal Al-Dhahir (University of Texas, Dallas, USA)

Waveform Design for Joint Radar-Communication with Nonideal Power Amplifier and Outband Interference
Yu Zhang, Qingyu Li, Ling Huang, Keren Dai, Jian Song (Tsinghua University, China)

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MAC3: Heterogeneous Networks I

Queue-Aware Small Cell Activation for Energy Efficiency in Two-tier Heterogeneous Networks
Fancheng Kong (University of Technology, Sydney; NUPT, Australia)
Xinghua Sun (NUPT, China)
Victor C.M. Leung (University of British Columbia, Canada)
Y. Jay Guo (University of Technology, Sydney, Australia)
Qi Zhu, Hongbo Zhu (NUPT, China)

A Joint Scheduling and Resource Allocation Scheme for Millimeter Wave Heterogeneous Networks
Yilin Li, Jian Luo, Wen Xu, Nikola Vucic, Emmanouil Pateromichelakis (Huawei Technologies Duesseldorf GmbH, Germany)
Giuseppe Caire (Technische Universität Berlin, Germany)

Joint Bandwidth & Power Allocation for EE Optimization in Heterogeneous LTE/WiFi Multi-Home Networks
Fan Yang, Xi Zhang (Texas A&M University, USA)

Massive Access for Machine-Type Communications in Backhaul-Constrained Heterogeneous Networks
Yannan Ruan, Wei Wang, Zhaoyang Zhang (Zhejiang University, China)

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MAC4: Internet of Things

On Optimal Relay Nodes Position and Selection for Multi-path Data Streaming
James Nguyen (US Army CERDEC, USA)
Yalong Wu, Weichao Gao, Wei Yu, Chao Lu (Towson University, USA)
Daniel Ku (CERDC; Space and Terrestrial Communications Directorate, USA)

Spatial and Temporal Aggregation for Small and Massive Transmissions in LTE-M Networks
Po-Yen Chang (National Chiao Tung University, Taiwan)
Jia-Ming Liang (Chang Gung University, Taiwan)
Jen-Jee Chen (National University of Tainan, Taiwan)
Kun-Ru Wu, Yu-Chee Tseng (National Chiao Tung University, Taiwan)

FH-SCMA: Frequency-hopping based Sparse Code Multiple Access for Next Generation Internet of Things
Zhicheng Bai, Bo Li, Mao Yang, Zhongjiang Yan, Xiaoya Zuo, Yongping Zhang (Northwestern Polytechnical University, China)

A Slotted Aloha Message Concentration Protocol for Wireless Sensor Networks
Steven Weber (Drexel University, USA)

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MAC5: LTE Multiple Access

A Dual Priority Component Carrier Selection Algorithm in LTE-Advanced Systems
Shiqing Sun (Peking University, China)
Siduo Shen, Yusun Fu (Shanghai Huawei Technologies Co. Ltd, China)
Yuping Zhao (Peking University, China)

Uplink Performance of Enhanced Licensed assisted Access (eLAA) in Unlicensed Spectrum
Reem Karaki (Ericsson Research, Germany)
Jung-Fu (Thomas) Cheng (Ericsson Research, USA)
Evanny Obregon (Ericsson Research, Sweden)
Amitav Mukherjee (Ericsson Research, USA)
Du Ho Kang, Sorour Falahati (Ericsson Research, Sweden)
Havish Koorapaty (Ericsson Research, USA)
Oskar Drugge (Ericsson Research, Sweden)

Energy-Efficient Dynamic Point Selection for Cloud Radio Access Networks (C-RAN)
Ching-Kuo Hsu (National Chiao Tung University, Taiwan)
Jia-Ming Liang (Chang Gung University, Taiwan)
Kun-Ru Wu (National Chiao Tung University, Taiwan)
Jen-Jee Chen (National University of Tainan, Taiwan)
Yu-Chee Tseng (National Chiao Tung University, Taiwan)

Envisioning Spectrum Management InVirtualised C-RAN
Imad Samman (University of Bristol, UK)
Matteo Artuso, Henrik Christiansen (TU Denmark, Denmark)
Angela Doufexi, Mark Beach (University of Bristol, UK)

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NET5: Sensor Networks I

The Effect of Popularity Rule on Capacity and Delay in Multi-Sink WSNs
Hajar Barani (New Mexico State University, USA)
Yousef Jaradat (Al-Zaytoonah University of Jordan, Jordan)
Hong Huang (New Mexico State University, USA)
Zhicheng Li (Harbin Institute of Technology, China)
Satyajayant Misra (New Mexico State University, USA)

Multimodal Data Fusion in Sensor Networks via Copula Processes
Pengfei Zhang (Oxford University, UK)
JingTing Liu (Nanyang Technological University, Singapore)
Ido Nevat (Institute for Infocomm Research, Singapore)
Gareth Peters (University College London, UK)

Reliable and Secure End-to-End Data Aggregation Using Secret Sharing in WSNs
Wael Y. Alghamdi, Hui Wu, Salil S Kanhere
(University of New South Wales, Australia)

A Trust Management based Framework for Fault-tolerant Barrier Coverage in Sensor Networks
Shibo He (Zhejiang University, China)
Yuanchao Shu (Microsoft Research, China)
Xianbin Cui (Zhejiang University, China)
Chunjuan Wei (Shanghai University of Electric Power, China)
Jiming Chen, Zhiguo Shi (Zhejiang University, China)

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NET6: Coding for Networks

Robust Coded Cooperation Based on Multi-Dimensional Spatially Coupled Repeat-Accumulate Codes
Ryosuke Tanaka, Koji Ishibashi
(University of Electro-Communications, Japan)

How to Tune Sparse Network Coding over Wireless Links
Pablo Garrido (University of Cantabria, Spain)
Daniel E. Lucani (Aalborg University, Denmark)
Ramón Agüero (University of Cantabria, Spain)

An Efficient Lightweight Stream Cipher Algorithm for Wireless Networks
Soumyadev Maity
(National Institute of Technology, Rourkela, India)
Koushik Sinha (Southern Illinois University, USA)
Bhabani Sinha (Indian Statistical Institute, India)

Diffusion Kalman Filter Algorithm for Adaptive Network with Quantized Information Exchange
Shujie Yang, Changqiao Xu, Jianfeng Guan (BUPT, China)

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NET7: Network Analytics and Machine Learning

Edge Big Data-Enabled Low-Cost Indoor Localization Based on Bayesian Analysis of RSS
Shuo Liu and Pengbo Si
(Beijing University of Technology, China)
Minghui Xu (Beijing Normal University, China)
Yu He and Yanhua Zhang
(Beijing University of Technology, China)

Twitter as a Source for Spatial Traffic Information in Big Data-Enabled Self-Organizing Networks
Henrik Klessig, Henning Kuntzschmann, Lucas Scheuvens, Philipp Schulz (Technische Universität Dresden, Germany)
Bjoern Almeroth (RadioOpt GmbH, Germany)
Gerhard Fettweis (Technische Universität Dresden, Germany)

NLOS Identification and Mitigation for Geolocation Using Least-squares Support Vector Machines
Benny Chitambira, Simon Armour (University of Bristol, UK)
Stephen Wales (Roke Manor Research, UK)
Mark Beach (University of Bristol, UK)

IEEE 802.11 Network Anomaly Detection and Attack Classification: A Deep Learning Approach
Vrizlynn L. L. Thing
(Institute for Infocomm Research, Singapore)

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NET8: Coverage in Cellular Networks

Energy Management in Cellular HetNets Assisted by Solar Powered Drone Small Cells
Ahmad Alsharoa (Iowa State University, USA)
Hakim Ghazzai, Abdullah Kadri
(Qatar Mobility Innovations Center, Qatar)
Ahmed E. Kamal (Iowa State University, USA)

A New Clustered HetNet Model to Accurately Characterize User-Centric Small Cell Deployments
Mehrnaz Afshang, Harpreet S. Dhillon (Virginia Tech, USA)

Exact Characterization of Spatio-temporal Joint Coverage Probability in Cellular Networks
Shankar Krishnan, Harpreet S Dhillon (Virginia Tech, USA)

Matching-Based Cell Selection for Proportional Fair Throughput Boosting via Dual-Connectivity
Qiaoni Han, Bo Yang, Cailian Chen, Xinping Guan
(Shanghai Jiao Tong University, China)

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PHY10: Cognitive Radio I

Impact of Improper Gaussian Signaling on the Achievable Rate of Overlay Cognitive Radio
Osama Amin, Walid Abediseid, Mohamed-Slim Alouini
(KAUST, Saudi Arabia)

On Outage Probability of Cooperative Cognitive Radio Networks Over κ-μ Shadowed Fading
Mahathi Poreddy, Thi My Chinh Chu,
Hans-Juergen Zepernick
(Blekinge Institute of Technology, Sweden)

PECAS: A Low-Cost Prototype for the Estimation of Channel Activity Statistics in Cognitive Radio
Miguel López-Benítez, Ahmed Al-Tahmeesschi
(University of Liverpool, UK)
Kenta Umebayashi
(Tokyo University of Agriculture and Technology, Japan)
Janne Lehtomäki (University of Oulu, Finland)

Service Time Analysis for Secondary Packet Transmission with Adaptive Modulation
Wenjing Wang (University of Victoria, Canada)
Muneer Usman (Google Inc., USA)
Hong-Chuan Yang (University of Victoria, Canada)
Mohamed-Slim Alouini (KAUST, Saudi Arabia)

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PHY11: Equalization, Detection and Signal Processing I

Rigorous Analysis on the Sensitivity of Cyclostationary Detection
Yonghong Zeng (Institute for Infocomm Research, Singapore)

Turbo Frequency Domain Equalization and Detection for Multicarrier Faster-Than-Nyquist Signaling
Siming Peng (PLAUST, China)
AiJun Liu
(Nanjing Institute of Communications Engineering, China)
Hua Fang, Ke Wang, Xiaohu Liang (PLAUST, China)

A Novel Practical CP Based Mismatched MMSE Equalization
Eren Balevi, Ali Özgür Yılmaz
(Middle East Technical University, Turkey)

Novel Fractional Spur Relocation in All Digital Phase Locked Loops
Basak Can, Balvinder S. Bisla, Anthony Tsangaropoulos, Satwik Patnaik (Intel Corporation, USA)

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PHY7: Massive MIMO II

Performance Analysis of RCI Precoding with Pilot Contamination in Finite Massive MIMO System
Shijuan Wu, Xiaofeng Tao, Na Li, Jin Xu (BUPT, China)

A Novel Pilot Assignment Approach for Pilot Decontaminating in Massive MIMO Systems
Pengbiao Wang, Chenglin Zhao, Yongjun Zhang
(BUPT, China)
Yang Zhang (UPC; BUPT, China)
Gordon Stüber (Georgia Institute of Technology, USA)

Layered Gibbs Sampling Algorithm for Near-Optimal Detection in Large-MIMO Systems
Manish Mandloi, Vimal Bhatia (IIT Indore, India)

A Noncoherent Differential Transmission Scheme for Multiuser Massive MIMO Systems
Jing Feng, Hui Gao (BUPT, China)
Taotao Wang (Chinese University of Hong Kong, Hong Kong)
Tiejun Lv (BUPT, China)
Weibin Guo
(Shenzhen Institute of Radio Testing and Technology, China)

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PHY8: Security II

Physical Layer Security with Untrusted Relays in Wireless Cooperative Networks
Guiyang Luo, Jinglin Li, Zhihan Liu, Xiaofeng Tao, FangChun Yang (BUPT, China)

Outage Constrained Secrecy Rate Maximization for Relay Networks Against Unknown Eavesdroppers
Qian Xu, Pinyi Ren, Qinghe Du, Li Sun, Yichen Wang
(Xi'an Jiaotong University, China)

Physical Layer Security Improvement by Constellation Selection and Artificial Interference
Datong Xu, Pinyi Ren, Qinghe Du, Li Sun, Yichen Wang
(Xi'an Jiaotong University, China)

Precoded Spatial Modulation for the Wiretap Channel with Relay Selection and Cooperative Jamming
Zied Bouida (Texas A&M University, Qatar)
Athanasios Stavridis (University of Edinburgh, UK)
Ali Ghrayeb (Texas A&M University, Qatar)
Harald Haas (University of Edinburgh, UK)
Mazen Omar Hasna (Qatar University, Qatar)

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PHY9: 5G Physical Layer I

Uplink PHY Design with Shortened TTI for Latency Reduction
Jingya Li, Henrik Sahlin, Gustav Wikström
(Ericsson, Sweden)

A Novel Waveform for Massive Machine-Type Communications in 5G
Yang Fan, Wang Xin (Fujitsu R&D Center, China)

Low Complexity Receiver for Uplink SCMA System via Expectation Propagation
Xiangming Meng, Yiqun Wu, Yan Chen, Meng Cheng
(Huawei Technologies, China)

Ultra-broadband, Hybrid High-Low Band Wireless Access
Aliye Ozge Kaya, Doru Calin, Harish Viswanathan
(Nokia Bell Labs)

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EMG5: Cellular Networks

An Approach to 5G Wireless Network Virtualization: Architecture and Trial Environment
Jianyuan Feng, Qixun Zhang, Guangzhe Dong, PengFei Cao, Zhiyong Feng (BUPT, China)

Improving Power Consumption for Cellular-Based Machine-Type Communication Systems
Bilal Rabah Al-Doori, Xian Liu
(University of Arkansas, Little Rock, USA)

Millimeter Wave System Performance Characterization for 5G Data Access
Shirish Nagaraj (Intel Corporation, USA)
Lea Castel (Intel Corporation, Denmark)
Tommaso Balercia (Intel Corporation, Denmark)
Bishwarup Mondal, Jong-kae Fwu (Intel Corporation, USA)

LWIP and Wi-Fi Boost Flow Control
David López-Pérez (Nokia Bell Labs, Ireland)
Jonathan Ling (Alcatel-Lucent, USA)
Bong Ho Kim (Nokia Bell Labs, USA)
Subramanian Vasudevan (Alcatel-Lucent, USA)
Satish Kanugovi (Nokia, India)
Ming Ding (Data 61, Australia)

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EMG6: Advances in Sensor Networks

A Cyber-Physical Design for Indoor Temperature Monitoring Using Wireless Sensor Networks
Cong Shen (USTC, China)
Shengbo Chen (Qualcomm R&D, USA)

In-network On-demand Query-based Sensing System for Wireless Sensor Networks
Noura Al-Hoqani (Loughborough University, UK)

On Lifetime Maximisation of Heterogeneous Wireless Sensor Networks with Multi-Layer Realisation
Muhammad Kamran Naeem, Mohammad N. Patwary (Staffordshire University, UK)

Indoor Corner Detection and Matching from Crowdsourced Movement Trajectories
Yuchen Sun, Bang Wang (HUST, China)

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MAC6: Vehicular Wireless Networks

User Differentiation Scheme for Slot Allocation in Vehicular Networks
Yiwei Mao, Lianfeng Shen
(NMCR Lab, Southeast University, China)

TDMA-aware Routing Protocol for Multi-hop Communications in Vehicular Ad Hoc Networks
Mohamed Hadded (Telecom SudParis, France)
Paul Muhlethaler (INRIA, France)
Anis Laouiti (TELECOM SudParis, France)
Leila Azouz Saidane (ENSI, University of Manouba, Tunisia)

Peer-to-Peer Protocol for Allocated Resources in Vehicular Cloud based on V2V Communication
Rodolfo Meneguette (Instituto Federal de Educação, Ciência e Tecnologia de São Paulo, Brazil)
Azzedine Boukerche (University of Ottawa, Canada)

Delay Efficient Disconnected RSU Placement Algorithm for VANET Safety Applications
Ali Jalooli, Min Song
(Michigan Technological University, USA)
Xiaohua Xu (Kennesaw State University, USA)

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MAC7: WiFi

A Simple Full-Duplex MAC Protocol Exploiting Asymmetric Traffic Loads in WiFi Systems
Murad Murad, Ahmed M. Eltawil (UC Irvine, USA)

Throughput-Enhanced Backoff Mechanism (TEBM) for High-Density IEEE 802.11 Networks
David Tung Chong Wong, Qian Chen, Francois Chin
(Institute for Infocomm Research, Singapore)

Generous Throughput Oriented Channel Assignment for Infra-structured WiFi Networks
Hadi Kasasbeh, Feng Wang, Lei Cao,
Ramanarayanan Viswanathan (University of Mississippi, USA)

An On-Line Radio Access Technology Selection Algorithm in an LTE-WiFi Network
Arghyadip Roy, Prasanna Chaporkar, Abhay Karandikar (IIT Bombay, India)

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MAC8: Channel Access

Channel Access based on Frequency-domain Contention in TV White Space
Zhong Tian, Jun Wang, Zhecheng An, Jian Song
(Tsinghua University, China)

Energy Efficiency Optimization of Channel Access Probabilities in IEEE 802.15.6 UWB WBANs
Yang Liu (USF, USA)
Kemal Davaslioglu (USF; UC Irvine, USA)
Richard D. Gitlin (USF, USA)

Lexicographic Relay Selection and Channel Allocation for Multichannel Cooperative Multicast
Yitu Wang, Wei Wang (Zhejiang University, China)
Lin Chen (University of Paris-Sud, France)
Zhaoyang Zhang (Zhejiang University, China)

Channel Access Balancing for Multiband Wireless LAN by Using Alternative Primary Channel
Kazuto Yano, Naoto Egashira, Satoshi Tsukamoto,
Julian L. Webber, Tomoaki Kumagai (ATR, Japan)

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NET10: Mobile Edge Computing

Adaptive Computation Scaling and Task Offloading in Mobile Edge Computing
Thinh Quang Dinh, Jianhua Tang, Quang Duy La,
Tony Q. S. Quek (SUTD, Singapore)

Dynamic Resource Allocation in Ad-Hoc Mobile Cloud Computing
Weiwei Chen (Hunan University, China)
Chin Tau Lea (HKUST, Hong Kong)
Kenli Li (Hunan University, China)

RainCloud - Cloudlet Selection for Effective Cyber Foraging
Chilukuri Shanti (GVP College of Engineering(A), India)
Sourabh Bollapragada (Northeastern University, USA)
Sainath Kommineni (Aveva Solutions India, India)
Kalyana Chakravarthy C
(MVGR College of Engineering, Vizianagaram, India)

Joint Task Offloading Scheduling and Transmit Power Allocation for Mobile-Edge Computing Systems
Yuyi Mao, Jun Zhang, Khaled B. Letaief
(HKUST, Hong Kong)

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NET11: Video Distribution

Stalling Assessment for Wireless Online Video Streams via ISP Traffic Monitoring
Hui Tang and Liang Chen (Shenzhen University, China)
Yue Wang
(Central University of Finance and Economics, China)
Na Wang (Shenzhen University, China)
Xia Li (Chinese University of Hong Kong, China)

Multicast Beamforming for Scalable Videos in Cache-Enabled Heterogeneous Networks
Xuewei Zhang, Hui Gao, Tiejun Lv (BUPT, China)

SCAST: Wireless Video Multicast Scheme Based on Segmentation and SoftCast
Li Yuanyuan, Zhenxin Li, Yu Liu, Yumei Wang
(BUPT, China)

Analytical Modeling of Losses in FDP Protocol of HbbTV based Push-VOD Services over DVB Networks
Ferdaouss Mattoussi, Gheorghe Zaharia,
Matthieu Crussière (IETR - INSA)
Jean-François Hélard (IETR, France)

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NET12: Mobile Ad Hoc Networks

Routing in Mobile Ad-Hoc Networks using Social Tie Strengths and Mobility Plans
Riten Gupta, Niyant Krishnamurthi
(UtopiaCompression Corporation, USA)
Uen-Tao Wang (Sandia National Laboratories, USA)
Tejaswi Tamminedi (UtopiaCompression Corporation, USA)
Mario Gerla (UCLA, USA)

Theoretical Analysis of Secrecy Transmission Capacity in Wireless Ad Hoc Network
Kan Yu
(Shandong University of Science and Technology, China)
Jiguo Yu (Qufu Normal University, China)
Xiuzhen Cheng, Tianyi Song (GWU, USA)

Formal Specification and Analysis of a Cross-Layer Overlay P2P Construction Protocol over MANETs
Youcef Hammal, Manel Seddiki, Benchaïba Mahfoud,
Abdelkrim Abdelli (USTHB University, Algeria)

Adaptive Rerouting to Avoid Local Congestion in MANETs
Kiyotaka Kaji and Takuya Yoshihiro
(Wakayama University, Japan)

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NET9: Sensor Networks II

Adaptive Path Planning of UAVs for Delivering Delay-Sensitive Information to Ad Hoc Nodes
JinYi Yoon, YeonJin Jin, Narangerelt Batsoyol,
HyungJune Lee (Ewha Womans University, Korea)

A Wireless Sensor Network Recharging Strategy by Balancing Lifespan of Sensor Nodes
Junyi Xu (Hefei University of Technology, China)
Xiaohui Yuan (University of North Texas, USA)
Zhenchun Wei, Jianghong Han, Lei Shi, Zengwei Lyu
(Hefei University of Technology, China)

Spatial Skeleton-enhanced Location Tracking for Indoor Localization
Chun-Jie Chiu, Kai-Ten Feng
(National Chiao Tung University, Taiwan)
Po-Hsuan Tseng
(National Taipei University of Technology, Taiwan)

Online Fault-Tolerant Dynamic Event Region Detection in Sensor Networks via Trust Model
Jiejie Wang, Bin Liu
(Nanjing University of Posts and Telecommunications, China)

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PHY12: Channel Estimation

Sparse Channel Estimation Using Correntropy Induced Metric Criterion Based SM-NLMS Algorithm
Yanyan Wang, Yingsong Li
(Harbin Engineering University, China)
Felix Albu (Valahia University of Targoviste, Romania)
Rui Yang (Huazhong Agricultural University, China)

Cooperative DF Cognitive Radio Networks with Spatial Modulation with Channel Estimation Errors
Ali Afana (Lakehead University, Canada)
Telex M. N. Ngatched
(Memorial University of Newfoundland, Canada)
Octavia A. Dobre (Memorial University, Canada)
Salama Said Ikki (Lakehead University, Canada)

Joint Channel Estimation and Detection of High Rate CCK Signaling in Underwater Communications
Lianyou Jing, Han Wang, Chengbing He
(Northwestern Polytechnical University, China)
Zhi Ding (UC Davis, USA)

Soft Decision Directed Dual-layer Channel Estimation for Time-Varying MIMO Channels
Xuehong Mao (Cadence, USA)
Seyyedkazem Hashemizadehkolowri, Rong-Rong Chen,
Behrouz Farhang-Boroujeny (University of Utah, USA)

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PHY13: Spectrum Sensing

On Low-complexity Spectrum Sensing: Analytical Approach based Spatial Scanning
Kaïs Bouallegue (IEMN-DOAE UVHC, France)
Iyad Dayoub (University Lille Nord de France IEMN-DOAE CNRS UMR UVHC, France; Concordia University, Canada)
Mohamed Gharbi (IEMN-DOAE UVHC CNRS, France)

An Adaptive Wavelet-based Scale Space Filtering Algorithm for Spectrum Sensing in Cognitive Radio
Henry Ohize
(University of Cape Town; Federal University of Technology, Minna, South Africa)
Mqhele E. Dlodlo (University of Cape Town, South Africa)
Adeiza J. Onumanyi, Habeeb Bello-Salau
(Federal University of Technology, Minna, Nigeria)

Dynamic Distribution-Free Spectrum Sensing
Yasser M.H. Abdelhamed, Mohamed Ammar Al Masri, Abu B. Sesay (University of Calgary, Canada)

A Computing Budget Allocation Approach to Multiband Spectrum Sensing
Joseph M Bruno, Brian Mark, Yariv Ephraim, Chun-Hung Chen (George Mason University, USA)

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PHY14: C-RAN II

Control-Data Separation across Edge and Cloud for Uplink Communications in C-RAN
Jinkyu Kang (Harvard University, Korea)
Osvaldo Simeone (NJIT, USA)
Joonhyuk Kang (KAIST, Korea)
Shlomo (Shitz) Shamai (Technion, Israel)

Robust Group Sparse Beamforming for Dense C-RANs with Probabilistic SINR Constraints
Ying-lei Teng, Wanxin Zhao (BUPT, China)

On the Transport Capability of LAN Cables in All-Analog MIMO-RoC Fronthaul
Syed Hassan Raza Naqvi, Andrea Matera, Lorenzo Combi, Umberto Spagnolini (Politecnico di Milano, Italy)

Resource Cost Balancing with Caching in C-RAN
Alaa Alameer Ahmad (Ruhr-Universitaet Bochum, Germany)
Aydin Sezgin
(RUB; Digital Communication Systems, Germany)

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PHY15: Waveforms I

Asynchronous Multi-User Uplink Transmissions for 5G with UFMC Waveform
Hyunwoo Cho, Yan Yan, Gk Chang, Xiaoli Ma
(Georgia Institute of Technology, USA)

Fast Algorithms for FBMC and GFDM in Dynamic Spectrum Access
Yonghong Zeng (Institute for Infocomm Research, Singapore)
Ying-Chang Liang
(UESTC; Institute for Infocomm Research, Singapore)
Meng Wah Chia
(ST Electronics & Info-Comm Systems, Singapore)
The Hanh Pham (Ngee Ann Polytechnic, Singapore)

A New Construction of Golay Complementary Sets of Non-Power-of-Two Length Based on Boolean Functions
Chao-Yu Chen (National Cheng Kung University, Taiwan)

Enhanced Inter-Sub-band Interference Suppression for Universal Filtered Multi-Carrier Transmission
Hong Wang, Zhaoyang Zhang (Zhejiang University, China)
Yu Zhang (Zhejiang University of Technology, China)
Guanding Yu (Zhejiang University, China)

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PHY16: Channel Coding

Early Termination of Turbo Decoding by Identification of Undecodable Blocks
Mohammed AlMahamdy, Jeffrey Dill (Ohio University, USA)

Modified Cryptographic Turbo Code for Sensitive Information
Vidya Sawant (NMIMS University; MPSTME, India)
Archana Bhise (MPSTME, India)

Improved Fountain Codes for BI-AWGN Channels
Amrit Kharel, Lei Cao (University of Mississippi, USA)

Relay Node Selection and Power Allocation for Distributed Self-Concatenated Convolutional Codes
Haji Muhammad Furqan Ahmed Madni
(Istanbul Medipol University, Turkey)
Muhammad Fasih Uddin Butt, Nida Zamir
(COMSATS Institute of Information Technology, Pakistan)
Soon Xin Ng (University of Southampton, UK)

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EMG7: Spectrum II

HARQ Feedback in Unlicensed Spectrum LTE: Design and Performance Evaluation
Amitav Mukherjee (Ericsson Research, USA)
Fredrik Lindqvist (Ericsson, Sweden)
Jung-Fu (Thomas) Cheng (Ericsson Research, USA)

Enabling Spectrum Sharing between LTE and RADAR Systems in S-band
Venkatesh Ramaswamy, Jeffery Correia
(MITRE Corporation, USA)

Interference Measurements in the European 868 MHz ISM Band with Focus on LoRa and SigFox
Mads Lauridsen, Benny Vejlgaard
(Aalborg University, Denmark)
István Z. Kovács (Nokia Bell Labs; Aalborg, Denmark)
Huan Cong Nguyen, Preben Mogensen
(Aalborg University, Denmark)

Throughput Analysis of LTE-Licensed-Assisted Access Networks with Imperfect Spectrum Sensing
Zhuoran Fu, Wenjun Xu, Zhiyong Feng, Lin Xue Hong, Jiaru Lin (BUPT, China)

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EMG8: Localization II

Visible Light Positioning with Diffusing Lamps Using an Extended Kalman Filter
Zafer Vatansever, Maite Brandt-Pearce
(University of Virginia, USA)

Automatic Hybrid Access Point Deployment for Wireless Localization Systems
Yun-Ting Hung, Kai-Ten Feng
(National Chiao Tung University, Taiwan)
Po-Hsuan Tseng
(National Taipei University of Technology, Taiwan)

Localization of WiFi Devices Using Probe Requests Captured at Unmanned Aerial Vehicles
Virgilio Acuna (FIU, USA)
Abhaykumar Kumbhar (FIU; Motorola Solutions, Inc, USA)
Edwin Vattapparamban, Farid Rajabli (FIU, USA)
Ismail Güvenç (NC State University, USA)

Indoor Radio Map Construction based on Crowdsourced Fingerprint Splitting and Fitting
Yanzhen Ye, Bang Wang (HUST, China)

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MAC10: Cooperative MAC

On the Performance of the DNPS-based Relay Networks Under Attack by Masquerader
Wenson Chang (National Cheng Kung University, Taiwan)

A Cooperative Scheme for the Coexistence of the LTE and WiFi Systems
Kareem M Metwaly, Karim G. Seddik
(American University, Egypt)
Mustafa ElNainay (Alexandria University; Virginia Tech, Egypt)

AJRC-MAC: An ALOHA-based Joint Reservation and Cooperation MAC for Dense Wireless Networks
Yongping Zhang, Bo Li, Mao Yang, Zhongjiang Yan, Xiaoya Zuo, Qiao Qu
(Northwestern Polytechnical University, China)

ERA Cooperative sensing with Differentiated Sensing Period and Retreat Scheme in Cognitive Radio
Wenson Chang, HaoYi Tai
(National Cheng Kung University, Taiwan)
Yinman Lee (National Chi Nan University, Taiwan)
Szu-Lin Su (National Cheng Kung University, Taiwan)

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MAC11: Energy Efficient MAC

Beacon Scheduling in Receiver-initiated MAC Protocols for Low-delay and Energy-efficient WSNs
Akihiro Fujimoto, Yukari Masui, Takuya Yoshihiro, Fumitaka Uchio (Wakayama University, Japan)

Joint Optimization of Energy Efficiency and Scheduling Strategies for Side-link Relay System
Vinay Kumar Shrivastava, Piyush Makhija, Rohan Raj
(Samsung Semiconductor India R&D, India)

Energy Efficient Base Station on/off with User Association under C/U Split
Haimeng Wu (BUPT, China)
Xiaodong Xu
(BUPT; Wireless Technology Innovation Institute, China)
Yan Sun, Aini Li (Queen Mary University of London, UK)

Energy and Spectrum Efficient Resource Allocation in Two-Tier Networks: A Multiobjective Approach
Meysam Masoudi (KTH, Sweden)
Hamid Reza Zaefarani, Abbas Mohammadi
(Amirkabir University of Technology, Iran)
Cicek Cavdar (KTH, Sweden)

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MAC9: Random Access

Impact of Request Aggregation on Machine Type Connection Establishment in LTE-Advanced
Mikhail Vilgelm, Wolfgang Kellerer
(Technical University of Munich, Germany)

DARA: A Delay-aware Random Access for Slot Assignment in Long-distance Wireless Networks
Xi Chen, Chuanhe Huang, Shaojie Wen
(Wuhan University, China)
Zongpeng Li (Wuhan University; University of Calgary, China)

Exhaustive, Iterative and Hybrid Initial Access Techniques in mmWave Communications
Lili Wei, Clara (Qian) Li, Geng Wu (Intel Corporation, USA)

Explicit Power Ramping during Random Access in LTE/LTE-A
Jelena Mišić, Vojislav B. Mišić, M. Zulfiker Ali
(Ryerson University, Canada)

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NET13: Sensor Network Algorithms

A Game Theoretic Approach for Energy-Efficient Clustering in Wireless Sensor Networks
Afraa Attiah, Cliff Zou, Mainak Chatterjee
(University of Central Florida, USA)

Exact Algorithms for Maximizing Lifetime of WSNs using Integer Linear Programming
Xinshu Ma, Xiaojun Zhu, Bing Chen
(Nanjing University of Aeronautics and Astronautics, China)

An Improved Distributed Energy Efficient Clustering Algorithm for Heterogeneous WSNs
Benyin Xie, Chaowei Wang, Di Liu, Wang Weidong
(BUPT, China)

Analysis of Energy Efficient Clustering Schemes with Isolated Node Issue in Aerial Wireless Sensors
Kwan-Wu Su, Jenq-Shiou Leu
(National Taiwan University of Science and Technology, Taiwan)

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NET14: C-RAN Networks

Green Cloud Computing for Multi Cell Networks
Meysam Masoudi (KTH, Sweden)
Behzad Khamidehi (University of Toronto, Canada)
Cicek Cavdar (KTH, Sweden)

Energy Efficient Resource Allocation in Heterogeneous Cloud Radio Access Networks
Xiangyu He, Anqi He, Yue Chen, Kok Keong Chai
(Queen Mary University of London, UK)
Tiankui Zhang (BUPT, China)

Cluster Formation with Data-Assisted Channel Estimation in Cloud-Radio Access Networks
Yourong Ban, Mingfeng Xu, Zhongyuan Zhao, Yong Li
(BUPT, China)
Zhiguo Ding (Lancaster University, UK)

Layered Hierarchical Caching for SVC-based HTTP Adaptive Streaming over C-RAN
Zhilong Zhang, Yaxiong Yuan, Danpu Liu (BUPT, China)

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NET15: Handover in Cellular Networks

Handover Modeling for Indoor Li-Fi Cellular Networks: The Effects of Receiver Mobility and Rotation
Mohammad Dehghani Soltani, Hossein Kazemi, Majid Safari, Harald Haas (University of Edinburgh, UK)

CoMP Handover Probability Analysis with Different Handover Schemes in Ultra-Dense Networks
Liu Mengting, Ying-lei Teng, Mei Song (BUPT, China)

On the Handover Security Key Update and Residence Management in LTE Networks
Quoc-Tuan Vien, Tuan Anh Le, Xin-She Yang
(Middlesex University, UK)
Trung Q. Duong (Queen's University Belfast, UK)

Dynamic User Association in Enterprise Small Cell Networks with Hybrid Access
Xiaoxiao Wang, Cong Shen (USTC, China)

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PHY17: Massive MIMO III

Cognitive Massive MIMO Relay Networks
Gayan Amarasuriya, Yikai Li
(Southern Illinois University, USA)

Relay Selection for Cognitive Massive MIMO Two-Way Relay Networks
Shashindra Silva, Masoud Ardakani, Chintha Tellambura
(University of Alberta, Canada)

Interference-Aware Flexible TDD Design for Massive MIMO 5G Systems
David M. Gutierrez-Estevez (Samsung Electronics, UK)

New Stochastic Geometry-based Analysis of Uplink Massive MIMO in Asymptotic Antenna Regime
Priyabrata Parida
(Virginia Polytechnic Institute & State University, USA)
Harpreet S Dhillon (Virginia Tech, USA)

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PHY18: Applications of Compressed Sensing

Exploiting Channel Sparsity for Data Compression in Massive MIMO Baseband Processing
Yangxurui Liu, Xiang Gao, Ove Edfors, Liang Liu, Viktor Öwall (Lund University, Sweden)

CS-PSO Algorithm for Off-Grid Narrow-Band Interference Mitigation in OFDM Systems
Hanan Al-Tous, Imad Barhumi, Abdulrahman Kalbat
(UAE University, UAE)
Naofal Al-Dhahir (University of Texas, Dallas, USA)

Correlation Based Adaptive Compressed Sensing for Millimeter Wave Channel Estimation
Jianyi Yang
(BUPT; Beijing Advanced Innovation Center for Future Internet Technology)
Zaixue Wei, Xin Zhang, Nanxi Li, Lin Sang (BUPT, China)

Pilot Signal Design for Compressive Sensing Based Random Access in Machine-Type Communications
Nam Yul Yu, KyungJun Lee, Jinho Choi (GIST, Korea)

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PHY19: Security III

SOQR: Secure Optimal QoS Routing in Wireless Ad Hoc Networks
Yang Xu (Xidian University, China)
Jia Liu (National Institute of Informatics, Japan)
Xiaohong Jiang, Osamu Takahashi
(Future University Hakodate, Japan)
Norio Shiratori (Tohoku University, Japan)

The Effect of Transmitter's Eavesdropper CSI on the Secure Degrees of Freedom of the MIMO MAC
Mohamed Amir Khalil (Qatar University, Canada)
Tamer Khattab (Qatar University, Qatar)

On the Secure Degrees of Freedom of the K User MIMO MAC with Statistical CSI
Mohamed Amir Khalil (Qatar University, Canada)
Tamer Khattab (Qatar University, Qatar)

Physical Layer Security Enhancement in Multiuser Mixed RF/FSO Relay Networks under RF Interference
Ahmed Hassan Abd El-Malek
(Pharos University, Alexandria, Egypt)
Anas M. Salhab, Salam A. Zummo (KFUPM, Saudi Arabia)
Mohamed-Slim Alouini (KAUST, Saudi Arabia)

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PHY20: Cognitive Radio II

Achievability of the Sum-Capacity of Cognitive Networks under Different Channel Gain Conditions
Rana D Hegazy (Cairo University, Egypt)
Ashraf Badawi (Zewail City for Science and Technology, Egypt)

On Residual Energy Maximization in Energy Harvesting Cognitive Radio Network
Avik Banerjee, Santi Prasad Maity, Subhabrata Roy
(Indian Institute of Engineering Science and Technology, Shibpur, India)

Primary Channel Gain Estimation for Spectrum Sharing in Cognitive Radio Networks
Lin Zhang, Wenli Zhou, Guodong Zhao, Gang Wu, Zhi Chen (UESTC, China)

Multi-agent Reinforcement Learning Based Cognitive Anti-jamming
Mohamed Attia Aref, Sudharman Jayaweera, Stephen Machuzak (University of New Mexico, USA)

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PHY21: Full Duplex

On Capacity of Full-Duplex Cognitive Cooperative Radio Networks with Optimal Power Allocation
Thi My Chinh Chu and Hans-Juergen Zepernick
(Blekinge Institute of Technology, Sweden)

Full-Duplex Heterogeneous Networks: Ergodic Rate Analysis with Realistic Interference Modeling
Heng-Ming Hu, Chun-Hung Liu, Kai-Chieh Chang
(National Chiao Tung University, Taiwan)

Self-Interference Distribution over Full-Duplex Multi-User MIMO Channels
Arman Shojaeifard, Kai Kit Wong
(University College London, UK)
Marco Di Renzo (Paris-Saclay University; CNRS, France)
Khairi A. Hamdi (University of Manchester, UK)
Jie Tang (South China University of Technology, China)

Optimal Resource Allocation for Full-Duplex Wireless Video Transmissions under Delay Constraints
Chuang Ye, M. Cenk Gursoy, Senem Velipasalar
(Syracuse University, USA)

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PHY22: Energy Harvesting / SWIPT

Joint Transceiver Design for Full-Duplex Cloud Radio Access Networks with SWIPT
Ming-Min Zhao (Zhejiang University, China)
Qingjiang Shi (Zhejiang Sci-Tech University, China)
Mingyi Hong (Iowa State University, USA)
Yunlong Cai, Minjian Zhao (Zhejiang University, China)

Near Optimal Power Splitting Protocol for Energy Harvesting based Two Way Multiple Relay Systems
Ahmad Alsharoa (Iowa State University, USA)
Hakim Ghazzai (QMIC, Qatar)
Ahmed E. Kamal (Iowa State University, USA)
Abdullah Kadri (QMIC, Qatar)

Downlink Beamforming Design with Simultaneous Energy and Secure Information Transmission
Ramadan Elsabae (Loughborough University, UK)
Bokamoso Basutli
(Botswana International University of Science and Technology, Botswana)
Yu Gong, Sangarapillai Lambotharan
(Loughborough University, UK)

Modeling and Analysis of Ambient RF Energy Harvesting in Networks with Secrecy Guard Zones
Mustafa A. Kishk, Harpreet S. Dhillon (Virginia Tech, USA)

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EMG10: HetNets and Small Cells

Energy Efficient Sleep Strategy for Decoupled Uplink/Downlink Access in HetNets
Lan Zhang, Gang Feng, Shuang Qin, Wei Jiang, Yao Sun
(UESTC, China)

Energy Efficiency Analysis for Outdoor Wireless Small Cell Backhaul
Bessie Malila, Olabisi Emmanuel Falowo, Neco Ventura
(University of Cape Town, South Africa)

Study of Mobility in Cache-enabled Wireless Heterogeneous Networks
Bitan Banerjee, Chintha Tellambura
(University of Alberta, Canada)

Joint User Association and Energy Aware Routing for Green Small Cell mmWave Backhaul Networks
Enrica Zola (Technical University of Catalonia, Spain)
Andreas J. Kassler (Karlstad University, Sweden)
Wooseong Kim (Gachon University, Korea)

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EMG9: Applications I

An In-Vivo Communication System for Monitoring Medication Adherence
Aditya Dua, William Weeks, Alberto Berstein, Robert Azevedo, Ronny Li, Andy Ward (Proteus Digital Health, USA)

Calorie Map: An Activity Intensity Monitoring System based on Wireless Signals
Ting-Hui Chiang, Yi-Ta Chuang, Chia-Liang Ke
(National Chiao-Tung University, Taiwan)
Ling-Jyh Chen (Academia Sinica, Taiwan)
Yu-Chee Tseng (National Chiao-Tung University, Taiwan)

Multimodal Deep Learning Approach for Joint EEG-EMG Data Compression and Classification
Ahmed Ben Saïd, Amr Mohamed, Tarek M. Elfouly
(Qatar University, Qatar)
Khaled A. Harras (Carnegie Mellon University, USA)
Z. Jane Wang (University of British Columbia, Canada)

Implementation of a Wireless Time Distribution Testbed Protected with Quantum Key Distribution
Jason D Bonior, Phil Evans, Greg Sheets, John Jones Jr, Toby Flynn (Oak Ridge National Laboratory, USA)
Lori Ross O'Neil, William Hutton, Richard Pratt, Thomas E. Carroll
(Pacific Northwest National Laboratory, USA)

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MAC12: Wireless Networking I

A High Spectral Efficiency Hybrid ARQ Protocol with Low Latency
Hairuo Zhuang (Samsung US R&D Center, USA)

Admission Control based on WRR in WiMAXNetworks
Jalel Ben-Othman (University of Paris 13, France)
Jean-Michel Fourneau
(University of Versailles St-Quentin en Yvelines, France)
Lynda Mokdad
(Université de Paris 12; Laboratoire LACL, France)
Abdelkrim Abdelli (USTHB University, Algiers, Algeria)

A Distributed User Association Algorithm for State Dependent Wireless Networks
S. Ramakrishnan, Venkatesh Ramaiyan, Naveen Kolar Purushothama (IIT Madras, India)

Low Latency Relay Processing Scheme for WLAN Systems Employing Multiband Simultaneous Transmission
Naoto Egashira, Kazuto Yano, Satoshi Tsukamoto, Julian L. Webber, Tomoaki Kumagai (ATR, Japan)

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MAC13: Cognitive Radio

Optimizing Secondary User Performance Under Delay Constraint for Primary User
Mohamed Salman, Lijun Chen
(University of Colorado, Boulder, USA)

A Wideband Spectrum Data Segment Compression Algorithm in cognitive Radio Networks
Yujie Li, Zhibin Gao, Lianfen Huang
(Xiamen University, China)
Zhoujin Tang
(China Aerospace Science & Industry Corp, China)
Xiaojiang Du (Temple University, USA)

Cognitive Networking with Dynamic Traffic Classification and QoS Constraints
Marco Levorato (UC Irvine, USA)

Distributed Resource Allocation for Cognitive HetNets with Cross-tier Interference Constraint
Yongjun Xu, Yuan Hu, Qianbin Chen, Rong Chai, Guoquan Li (CUPT, China)

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MAC14: Wireless Sensor Networks

A Distributed Unselfish Spectrum Assignment for Smart Microgrid Cognitive Wireless Sensor Networks
Aroua Sabrine (University of la Rochelle; ENSI, France)
Inès El Korbi (University of Manouba, Tunisia)
Yacine Ghamri-Doudane (University of la Rochelle, France)
Leila Azzouz Saidane
(Lab CRISTAL- ENSI, University Manouba, Tunisia)

MAC Layer Assisted Localization in Wireless Environments with Multiple Sensors and Emitters
Paul Garver, Edward Coyle, Randal Abler
(Georgia Institute of Technology, USA)

Throughput and Energy Efficiency of MAC Protocols for Mobile Wireless Sensor Networks
Xiaoli Zhou, Azzedine Boukerche
(University of Ottawa, Canada)

Gains of Deadline based Discarding (DbD) over Lossy Wireless Sensor Networks
Halit Murat Gürsu, Wolfgang Kellerer
(Technische Universität München, Germany)

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NET16: LTE Networks

Efficient Grouping and Resource Allocation for Multicast Transmission in LTE
Sadaf ul Zuhra, Prasanna Chaporkar, Abhay Karandikar
(IIT Bombay, India)

LTE Multimedia Broadcast Multicast Service Provisioning Based on Robust Header Compression
Chen Jiang, Wenhao Wu, Zhi Ding (UC Davis, USA)

A Novel RAT Virtualization System with Network -Initiated RAT Selection between LTE and WLAN
Dai Kimura, Yoshiharu Tajima, Yun Wen, Hiroaki Senoo
(Fujitsu Laboratories Ltd., Japan)

A Dynamic Hybrid Counting Procedure for eMBMS of 3GPP
Yuehong Huang, Yu-Chee Tseng
(National Chiao Tung University, Taiwan)

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NET17: Sensor Network Protocols

Delay Minimization by Adaptive Framing Policy in Cognitive Sensor Networks
Abolfazl Razi, Ali Valehi (Northern Arizona University, USA)
Elizabeth Serena Bentley (AFRL, USA)

LBRR: Load Balanced Ring Routing Protocol for Heterogeneous Sensor Networks with Sink Mobility
Sonam Maurya, Vinayak Gupta, Vinod Kumar Jain
(PDPM Indian Institute of Information Technology, Design and Manufacturing, Jabalpur, India)

Multipath Management Scheme for Supporting Sink Mobility in Wireless Sensor Networks
Cheonyong Kim, Yongbin Yim, Taehun Yang, Sangdae Kim, Sang-Ha Kim (Chungnam National University, Korea)

Low-Cost Multipath Routing Protocol by Adapting Opportunistic Routing in Wireless Sensor Networks
Sangdae Kim, Hyunchong Cho, Taehun Yang, Cheonyong Kim, Sang-Ha Kim
(Chungnam National University, Korea)

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NET18: D2D Networking I

Content Synchronization with Feedback in Smart City Device-to-Device Communication
Xiao Chen (Texas State University, USA)
Wenzhong Li (Nanjing University, China)

Joint Access Selection and Resource Allocation in Cache-enabled HCNs with D2D Communications
Zhiyuan Tan, Xi Li (BUPT, China)
F. Richard Yu (Carleton University, Canada)
Lei Chen, Hong Ji (BUPT, China)
Victor C.M. Leung (University of British Columbia, Canada)

Dynamic Social-Aware Peer Selection Scheme for Cooperative Device-to-Device Communications
Yue Meng, Chunxiao Jiang (Tsinghua University, China)
Quang Duy La, Tony Q. S. Quek (SUTD, Singapore)
Yong Ren (Tsinghua University, China)

Channel-Aware Device-to-Device Pairing for Collaborative Content Distribution
Jianguo Xie, Wei Song (University of New Brunswick, Canada)

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PHY23: Massive MIMO IV

Can the use of reconfigurable antennas overcome the CSI bottleneck for FDD Massive MIMO?
Máximo Morales-Céspedes
(Université Catholique de Louvain, Spain)
Jorge Plata-Chaves (KU Leuven, Belgium)
Ana Garcia Armada (Universidad Carlos III de Madrid, Spain)
Marc Moonen (KU Leuven, Belgium)
Luc Vandendorpe
(Université Catholique de Louvain, Belgium)

Unlocking Massive MIMO Downlink Capacity in City-Wide 5G Deployments
Siming Zhang (China Mobile Research Institute; Green Communications Research Center, China)
Angela Doufexi, Andrew Nix (University of Bristol, UK)

Coherence Time of Wireless Channels with Large Antenna Arrays
Mainak Chowdhury (Stanford University, USA)
Junyoung Nam (Fraunhofer HHI, Germany)
Andrea Goldsmith (Stanford University, USA)

DoA Estimation and Performance Analysis for Multi-Cell Multi-User 3D mmWave Massive-MIMO OFDM System
Rubayet Shafin (University of Kansas; ITTC, USA)
Lingjia Liu (University of Kansas, USA)

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PHY24: Security IV

Ergodic Secrecy Rate of Randomly Deployed Cellular Networks Enhanced by Artificial Noise
Hui Chen, Xiaofeng Tao, Na Li (BUPT, China)
Zhu Han (University of Houston, USA)

On the Secrecy Rate of Artificial Noise Assisted MIMOME Channels with Full-duplex Receiver
Sangseok Yun, Junguk Park, Sanghun Im, Jeongseok Ha (KAIST, Korea)

Downlink Secure Transmission with Base Station Cooperation Using Artificial Noise
Xidong Mu, Li Guo, Chao Dong (BUPT, China)

Increasing the Security of Wireless Communication Through Relaying and Interference Generation
Luca Rose
(Mathematical and Algorithmic Sciences Lab, Huawei France Research Center, France)
Elizabeth Quaglia (Royal Holloway, University of London, UK)
Stefan Valentin (Huawei Technologies, France)

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PHY25: Network/Index Coding

High Reliability Downlink Transmission with Superposition Modulated Side Information
Afshin Haghighat, Sanjeewa P. Herath
(InterDigital Communications, Inc., Canada)

Optimal Linear Error Correcting Index Codes for Some Index Coding Problems
Nujoom Kara, B. Sundar Rajan
(Indian Institute of Science, India)

Optimal Linear Error-Correcting Index Codes for Single-Prior Index-Coding with Side Information
Simon Samuel, B. Sundar Rajan
(Indian Institute of Science, India)

Optimized Instantly Decodable Network Coding Protocols with Unequal Error Protection
Niranjana Ambadi, Gudavalli Praveen Kumar, B. Sundar Rajan (Indian Institute of Science, India)

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PHY26: Millimeter Wave

Coordinated Beamforming Training for mmWave and Sub-THz Communications with Antenna Subarrays
Cen Lin, Geoffrey Li (Georgia Tech, USA)

Impact of Humans on the Design and Performance of Millimeter Wave Cellular Networks in Stadiums
Mandar N. Kulkarni (University of Texas, Austin, USA)
Aliye Ozge Kaya (Nokia Bell Labs, USA)
Doru Calin (Nokia, USA)
Jeffrey Andrews (University of Texas, Austin, USA)

Measurement Results for Millimeter Wave pure LOS MIMO Channels
Tim Hälsig (Universität der Bundeswehr München, Germany)
Darko Cvetkovski (Humboldt University of Berlin, Germany)
Eckhard Grass (IHP; Humboldt-University Berlin, Germany)
Berthold Lankl
(University of Federal Armed Forces Munich, Germany)

Convolutional Modeling and Antenna De-embedding for Wideband Spatial mmWave Channel Measurement
Xiaofeng Lu (Huawei Technology Company, China)
Ruonan Zhang, Yuliang Zhou, Jiawei Liu, Xin Jin, Qi Guo (Northwestern Polytechnical University, China)
Chang Cao (Huawei Technologies Co., Ltd, China)

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PHY27: Equalization, Detection and Signal Processing II

Integer-Forcing Linear Receivers: A Design Criterion for Full-Diversity STBCs
J. Harshan (Advanced Digital Sciences Center, Singapore)
Amin Sakzad, Emanuele Viterbo
(Monash University, Australia)

Uplink Multiuser Massive MIMO Systems with One-Bit ADCs: A Coding-Theoretic Viewpoint
SongNam Hong (Ajou University, Korea)
Namyoon Lee (POSTECH, Korea)
Seonho Kim (Ajou University, Korea)

A Novel Method for Specific Emitter Identification Based on Singular Spectrum Analysis
Degang Sun, Yiwei Li, Yanyun Xu and Jianlin Hu
(IChinese Academy of Sciences, China)

A Novel Symbol-Based Near ML Detection Scheme with Unequal Error Protection for MIMO Systems
Yi-Fan Wang, Ju-Hong Lee
(National Taiwan University, Taiwan)

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PHY28: LTE Physical Layer

Time-of-arrival Estimation in Block-IFDMA Systems for LTE in Unlicensed Spectrum
Henrik Sahlin, Çağatay Çapar (Ericsson Research, Sweden)
Amitav Mukherjee (Ericsson Research, USA)

LTE Primary User Modeling Using a Hybrid ARIMA/NARX Neural Network Model in CR
Rania T. Fleifel
(Zewail City of Science and Technology; Cairo University, Egypt)
Samy S. Soliman (Cairo University, Egypt)
Ashraf Badawi
(Zewail City for Science and Technology, Egypt)
Walaa Hamouda (Concordia University, Canada)

Software-Defined LTE Evolution Testbed Enabling Rapid Prototyping and Controlled Experimentation
Vuk Marojevic, Deven Chheda, Raghunandan M. Rao, Randall Nealy, Jung-Min (Jerry) Park, Jeffrey Reed (Virginia Tech, USA)

Dynamic Channel Model and Performance Analysis for LTE-Hi
Yuhui Li, Yueliang Liu (BUPT, China China)
Xiang Zhang
(China Academy of Telecommunication Research of MIIT, China)
Qingyi Quan (BUPT, China)

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EMG11: Applications II

A New SDN-Based Architecture and Authentication Method for Taiwan High Speed Rail
Yi-Hao Lin, Ping-Fan Ho, Jyh-Cheng Chen
(National Chiao Tung University, Taiwan)
Jen-Shun Yang, Hsien-Wen Chang
(Industrial Technology Research Institute, Taiwan)
Chia-Che Hsu (National Chiao Tung University, Taiwan)

Profit Maximization Auction and Data Management in Big Data Markets
Yutao Jiao, Ping Wang, Dusit Niyato, Mohammad Abu Alsheikh, Shaohan Feng
(Nanyang Technological University, Singapore)

Particle-based Window Rotation and Scaling Scheme for Real-time Hand Recognition and Tracking
Bo-You Chen, Chun-Jie Chiu, Kai-Ten Feng
(National Chiao Tung University, Taiwan)

A Reliable Hybrid Wireless Network Architecture for Smart Grid Neighbourhood Area Networks
Huamiao Hu, Angela Doufexi, Simon Armour, Dritan Kaleshi (University of Bristol, UK)

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EMG12: Advances in Full Duplex

Impact of Time and Frequency Misalignments in OFDM based In-band Full-duplex Systems
Daesik Hong, Haesoon Lee, Jaeyoung Choi
(Yonsei University, Korea)
Dongkyu Kim (LG Electronics Co. Ltd., Korea)

Linear Digital Cancellation with Reduced Computational Complexity for Full-Duplex Radios
Muhammad Sohaib Amjad, Ozgur Gurbuz
(Sabanci University, Turkey)

Frequency-Domain Hammerstein Self-Interference Canceller for In-Band Full-Duplex OFDM Systems
Kazuki Komatsu, Yuichi Miyaji, Hideyuki Uehara
(Toyohashi University of Technology, Japan)

Timely CSI Acquisition Exploiting Full Duplex
Jesús Arnau
(Huawei Technologies Co. Ltd.; Mathematical and Algorithmic Sciences Lab, France Research Center, France)
Marios Kountouris (Huawei Technologies, France)

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MAC15: 5G MAC I

Performance Study of SCMA Codebook Design
Mehmood Alam, Qi Zhang (Aarhus University, Denmark)

Markov Channel-based Performance Analysis for Millimeter Wave Mobile Networks
Russell Ford, Sundeep Rangan (New York University, USA)
Evangelos Mellios, Di Kong, Andrew Nix
(University of Bristol, UK)

Joint Beam and Subband Resource Allocation with QoS Requirement for Millimeter Wave MIMO Systems
Li Hsiang Shen, Kai-Ten Feng
(National Chiao Tung University, Taiwan)

On the Feasibility of MAC and PHY Split in Cloud RAN
Ghizlane Mountaser, Maria Lema, Toktam Mahmoodi, Mischa Dohler (King's College London, UK)

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MAC16: Scheduling

High-Throughput and Fair Scheduling for Access Point Cooperation in Dense Wireless Networks
Mengyao Ge, Douglas Blough
(Georgia Institute of Technology, USA)

QoS-Guaranteed Channel-Aware Scheduling & Resource Grouping under Non-full Buffer Traffic for LTE-A
Yahsuan Cheng, Wun-Ci Su, Kai-Ten Feng, Li-Chun Wang
(National Chiao Tung University, Taiwan)

Adapting Downlink Power in Fronthaul-Constrained Hierarchical Software-Defined RANs
Xianfu Chen
(VTT Technical Research Centre of Finland, Finland)
Zhu Han (University of Houston, USA)
Zheng Chang (University of Jyväskylä, Finland)
Guoliang Xue (Arizona State University, USA)
Honggang Zhang (Zhejiang University; UEB; Supelec, China)
Mehdi Bennis (CWC, University of Oulu, Finland)

Real-time Partitioned Scheduling in Cloud-RAN with Hard Deadline Constraint
Ke Wang (BUPT, China)
Yi Cen (Minzu University of China, China)

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MAC17: Network Performance I

Outage Probability Study in a NOMA Relay System
Haijian Sun, Qun Wang, Rose Qingyang Hu
(Utah State University, USA);
Yi Qian (University of Nebraska, Lincoln, USA)

A Dynamic Channel Allocation Protocol for Medical Environment Under Multiple Base Stations
Bruno Cremonezi (DCC - UFJF, Brazil)
Alex Borges Vieira
(Universidade Federal de Juiz de Fora, Brazil)
Michele Nogueira (UFPR), Brazil; CMU, USA)
José Augusto Miranda Nacif
(Universidade Federal de Viçosa, Brazil)

REFIACC Scheme Evaluation using Analytical Modelling
Mohamed Amine Kafi
(Centre de Recherche sur Information Scientifique et Technique, Algeria)
Jalel Ben-Othman (University of Paris 13, France)
Lynda Mokdad
(Université de Paris 12; Laboratoire LACL, France)
Jean-Michel Fourneau
(University of Versailles St-Quentin en Yvelines, France)
Badache Nadjib (USTHB, Algeria)

RSS-based Grouping Strategy for Avoiding Hidden Terminals with GS-DCF MAC Protocol
Mohammad Ghasemiahmadi, Yue Li, Lin Cai
(University of Victoria, Canada)

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NET19: D2D Networking II

Dynamic Resource Allocation with Qos Guarantees for Clustered M2M Communications
Yali Wu (BUPT, China)
Ningbo Zhang
(BUPT; Science and Technology on Information Transmission and Dissemination in Communication Networks Lab, China)
Guixia Kang (BUPT, China)

Bipartite Graph Based Proportional Fair Resource Allocation for D2D Communication
Indranil Mondal (Qualcomm India Pvt. Ltd., India)
Anushree Neogi, Prasanna Chaporkar, Abhay Karandikar
(IIT Bombay, India)

D2D Underlaid Cellular Networks with User Clusters: Load Balancing and Downlink Rate Analysis
Chiranjib Saha
(Virginia Polytechnic Institute & State University, USA)
Harpreet S. Dhillon (Virginia Tech, USA)

A User Selection Algorithm for D2D Multicast Communication Underlaying Cellular Systems
Koichiro Kitagawa, Hiroaki Homma, Yasuhiro Suegara, Yoji Kishi (KDDI Research Inc., Japan)

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NET20: Vehicular Networks

Support Vector Machine (SVM) Based Sybil Attack Detection in Vehicular Networks
Pengwenlong Gu, Rida Khatoun (Telecom ParisTech, France)
Youcef Begriche, Ahmed Serhrouchni (ENST, France)

Transmission Performance Evaluation and Optimal Selection of Relay Vehicles in VANETs
Rong Chai, Yuanzheng Qin, Shangxin Peng, Qianbin Chen (CUPT, China)

Content Aided Clustering and Cluster Head Selection Algorithms in Vehicular Networks
Kai Zhang, Jingjing Wang, Chunxiao Jiang
(Tsinghua University, Beijing, China)
Tony Q. S. Quek (SUTD, Singapore)
Yong Ren (Tsinghua University, Beijing, China)

Stable Clustering for Ad-Hoc Vehicle Networking
Giorgia V. Rossi, Kin K. Leung (Imperial College, UK)
Zhong Fan, Woon Hau Chin
(Toshiba Research Europe Limited, UK)

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NET21: Topology, Routing and Clustering

Evaluating Seed Selection for Information Diffusion in Mobile Social Networks
Farouk Mezghani (INRIA Lille - Nord Europe, France)
Manel Mezghani (Université de Toulouse, IRIT, UPS, France)
Ahmad Kaouk (University of Toulouse 3 Paul Sabatier, France)
André-Luc Beylot (University of Toulouse, France)
Florence Sèdes (IRIT Université Paul Sabatier, France)

Topology Design for Directional Range Extension Networks with Antenna Blockage
Thomas Shake (MIT Lincoln Laboratory, USA)

Local Construction of Bounded-Degree Network Topologies Using Only Neighborhood Information
Erdem Koyuncu, Hamid Jafarkhani (UC Irvine, USA)

Optimal Request Clustering for Link Reliability Guarantee in Wireless Networked Control
Yu Chen, Hongwei Zhang (Wayne State University, USA)

A Routing Metric for Lossy Multipath Networks
Charline Jacquemin, Hicham Khalife
(Thales Communications & Security, France)
Raphael Naves (University of Toulouse, France)

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PHY29: Propagation and Channel Modeling II

Empirical Model Based on New Filtering Algorithm for High-Speed-Train Channels
Yueliang Liu, Yuhui Li (BUPT, China)
Xiang Zhang
(China Academy of Telecommunication Research of MIIT, China)
Wenbo Wang (BUPT, China)

Propagation Measurements at 5.8 GHz for Railroad Intelligent Transportation Systems
Christopher R. Anderson (United States Naval Academy, USA)
Carl B. Dietrich, Christopher Rowe (Virginia Tech, USA)
Thomas Tedesso (United States Naval Academy, USA)

A 3D Geometry-based Stochastic Channel Model for UAV-MIMO Channels
Linzhou Zeng, Xiang Cheng (Peking University, China)
Chengxiang Wang (Heriot-Watt University, UK)
Xuefeng Yin (Tongji University, China)

A Non-WSSUS Mobile-to-Mobile Channel Model Assuming Velocity Variations of the Mobile Stations
Carlos A. Gutiérrez
(Universidad Autonoma de San Luis Potosi, Mexico)
Matthias Pätzold (University of Agder, Norway)
Wiem Dahech, Neji Youssef
(Ecole Superieure des Communications de Tunis, Tunisia)

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PHY30: Waveforms II

A Joint Waveform and Precoding Design for Non-orthogonal Multicarrier Signals
Tongyang Xu, Izzat Darwazeh (University College London, UK)

Spectral Analysis of Predistorted Non-Linear Amplified Multicarrier Signals
Ali Cheaito and Mohamed Saad Farah
(INSA de Rennes, France)
Matthieu Crussière (IETR; INSA, France)
Jean-François Hélard (IETR, France)
Yves Louët (SUPELEC-Rennes Campus, France)

An Improved Recovery Algorithm Based on ISD for Multiband Signals
HuiYang Peng, Mengyue Liu, Lei Chen, Yu Liu
(BUPT, China)

Integrated Synchronization Scheme for WLAN Systems Employing Multiband Simultaneous Transmission
Naoto Egashira, Kazuto Yano, Satoshi Tsukamoto, Julian L. Webber (ATR, Japan)
Masayuki Sutoh, Yasuharu Amezawa
(Mobile Techno Corp, Japan)
Tomoaki Kumagai (ATR, Japan)

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PHY31: D2D

Multiple Device-to-Device Users Overlaying Cellular Networks
Ruochen Zeng, Cihan Tepedelenlioglu
(Arizona State University, USA)

Impact of Shadowing in D2D Communication
Sudharsan Parthasarathy, Radha Krishna Ganti
(IIT Madras, India)

Cooperative Transmission in Cognitive and Energy Harvesting-based D2D Networks
Yuanyuan Yao, Sai Huang, Norman C. Beaulieu, Changchuan Yin (BUPT, China)

Coverage Analysis of D2D Relay-Assisted

Millimeter-Wave Cellular Networks
Shuanshuan Wu (SUNY, Buffalo, USA)
Rachad Atat
(University of Kansas & Information and Telecommunication Technology Center, USA)
Nicholas Mastronarde (SUNY, Buffalo, USA)
Lingjia Liu (University of Kansas, USA)

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PHY32: SWIPT

QoS-Driven Resource Allocation for SWIPT with Finite-Alphabet Inputs
Tewodros Zewde, M. Cenk Gursoy
(Syracuse University, USA)

SWIPT for Max-Min Fair Multi-Group Multicast Beamforming Through Power Splitting
Özlem Tu ̧fe Demir, T. Engin Tuncer
(Middle East Technical University, Turkey)

Multi-Destination Cognitive Radio Relay Network with SWIPT and Multiple Primary Receivers
Ahmed Abdullah Al-habob
(KFUPM, Saudi Arabia; Taiz University, Yemen)
Anas M. Salhab, Salam A. Zummo (KFUPM, Saudi Arabia)
Mohamed-Slim Alouini (KAUST, Saudi Arabia)

Precoder Design for Simultaneous Wireless Information and Power Transfer with Finite-Alphabet Inputs
Xiaodong Zhu (UESTC, China)
Weiliang Zeng (Qualcomm Research, USA)
Chengshan Xiao
(Missouri University of Science and Technology, USA)

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PHY33: IoT/SON

NB-WiFi: IEEE 802.11 and Bluetooth Low Energy combined for Efficient Support of IoT
Leif R. Wilhelmsson, Miguel Lopez, Dennis Sundman
(Ericsson, Sweden)

On the Performance of Narrow-Band Internet of Things (NB-IoT)
Yihenew Beyene, Riku Jäntti, Kalle Ruttik, Sassan Iraji
(Aalto University, Finland)

Joint ICIC and Mobility Management Optimization in Self-Organizing Networks
Nur Tuncel, Mutlu Koca (Bogazici University, Turkey)

ON/OFF Reporting Mechanism for Robust Cooperative Sensing in Cognitive IoT Networks
Sunghwan Bae, Hongseok Kim (Sogang University, Korea)

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PHY34: Energy Efficiency

Optimizing Data Transmission Power for ARQ Energy Efficiency under Imperfect CSI
Ali Zarei Ghanavati, Daniel Lee
(Simon Fraser University, Canada)

Energy-Efficient Power and LNA Control for Wireless Multi-Channel Communication
Pengkai Zhao, Supratik Bhattacharjee, Jong Hyeon Park, Subrahmanya Parvathanathan, Brian Banister, Sim Narasimha (Qualcomm, USA)

Modeling and Analysis of Energy Consumption forMIMO Systems
Farhad E. Mahmood, Erik S. Perrins, Lingjia Liu
(University of Kansas, USA)

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EMG13: Networking I

WIST: Wi-SUN FAN Protocol Emulation Testbed
Douglas Comer, Rajas Karandikar, Adib Rastegarnia, Fatemeh Rouzbeh, Panchapakesan C. Sruthi (Purdue University, USA)

The Mobile Network Capability Exposure Friendly to the Mobile Internet Applications
Yifan Yu (Intel Labs China, China)

Performance Analysis of D2D Underlaid Massive MIMO Cellular Networks with Power Control
Anqi He (Queen Mary, University of London, UK)
Lifeng Wang (University College London, UK)
Yue Chen (Queen Mary University of London, UK)
Kai Kit Wong (University College London, UK);
Maged Elkashlan (Queen Mary, University of London, UK)

Towards Ubiquitous E-health: Modeling of SmartBAN Hybrid MAC under Periodic and Emergency Traffic
Lihua Ruan (University of Melbourne, Australia)
Maluge Pubuduni Imali Dias (NICTA Victoria Research Laboratory, Australia)
Elaine Wong (University of Melbourne, Australia)

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EMG14: Vehicular Communication

Adaptive Beaconing for Collision Avoidance and Tracking Accuracy in Vehicular Networks
Long Sun, Aiping Huang, Hangguan Shan (Zhejiang University, China)
Lin Cai (University of Victoria, Canada)

A Cloud-based Stream Processing Platform for Traffic Monitoring using Large-scale Probe Vehicle Data
Yiyang Pei (Singapore Institute of Technology, Singapore)
Xiaoyang Li, Liang Yu, Guangxia Li, Hai Heng Ng,
Jerry Kah Eng Hoe (Institute for Infocomm Reserch, Singapore)
Chee Wei Ang, Wee Siong Ng (Institute for Infocomm Research, Singapore)
Kenji Takao, Hirokazu Shibata, Koichiro Okada (Mitsubishi Heavy Industries, Ltd, Japan)

Communication Infrastructure for Dynamic Wireless Charging of Electric Vehicles
Allon Echols (Utah State Univserity, USA)
Sarbajit Mukherjee (Indian Institute of Engineering Science and Technology, Shibpur, India)
Zeljko Pantic, Madi Mickelsen (Utah State University, USA)

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MAC18: Wireless Networking II

AP Selection Algorithm with Adaptive CCAT for Dense Wireless Networks
Yena Kim (NIST, USA)
Mun-Suk Kim, SuKyoung Lee (Yonsei University, Korea)
David Griffith and Nada Golmie (NIST, USA)

Joint Wireless Charging and Hybrid Power based Resource Allocation for LTE-A Wireless Network
Shen-Fong Hung, Pei-Rong Li, Kai-Ten Feng (National Chiao Tung University, Taiwan)
Yu-Tse Lin (National Chung-Shan Institute of Science and Technology, Taiwan)

An Enhanced MAC Backoff Algorithm for Heavy User Loaded WLANs
Hang Qi, Zhiqun Hu, Xiangming Wen, Zhaoming Lu (BUPT, China)

A Study on Multiple Access Schemes for Wireless Control over the IEEE 802.15.4 Beacon-enabled Mode
Yushi Uematsu, Kentaro Kobayashi, Hiraku Okada and Masaaki Katayama (Nagoya University, Japan)

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MAC19: Heterogeneous Networks II

Polarization and Power Optimization for Spectrum Sharing in Cognitive Heterogeneous Cellular Network
Shuo Chen, Zhimin Zeng, Caili Guo (BUPT, China)

Optimizing Context-Aware Resource and Network Assignment in Heterogeneous Wireless Networks
Mohamad Zalghout (INSA de Rennes; IETR, France)
Samih Abdul-Nabi (Lebanese International University, Lebanon)
Ayman Khalil, Maryline Hélard, Matthieu Crussière (IETR; INSA, France)

On the Benefits and Implementation Costs of Multi-Cell Selection in Heterogeneous Networks
Ararat Shaverdian, Catherine Rosenberg (University of Waterloo, Canada)

Network Association with Dynamic Pricing Over D2D-Enabled Heterogeneous Networks
Alaa Awad Abdellatif, Amr Mohamed (Qatar University, Qatar)
Carla-Fabiana Chiasserini (Politecnico di Torino, Italy)
Tarek M. Elfouly (Qatar University, Qatar)

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NET22: Software Defined Networks II

A Novel Mobile Edge Computing-based Architecture for Future Cellular Vehicular Networks
Liang Li (Xidian University, China)

IP Stream-oriented Management Mechanism in 802.11 Wireless Network based on Extending SDN
Hui Yang, Hewu Li and Qian Wu (Tsinghua University, China)

A Practical Data Forwarding Path Selecting Method for Software-Defined 5G Networking
Dongxu Wang, Qiang Liu (National University of Defense Technology, China)
Tiejun Wu (Huawei Technologies Co., Ltd., China)
Huikang Yi, Han Han, Wentao Zhao (National University of Defense Technology, China)

Transmission Time Estimator for Social and Cloud Applications in Smartphones
Amit Panghal, Kannan Govindan, Karthikeyan Subramaniam (Samsung, India)

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NET23: Millimeter Wave Networks

Downlink SINR Coverage and Rate Analysis with Dual Slope Pathloss Model in mmWave Networks
PraveenKumar Korrai, Debarati Sen (IIT Kharagpur, India)

Location-based Initial Access and Beam Adaptation for Millimeter Wave Systems
Eunhye Park (KAIST, Korea)
Yonghoon Choi (Chonnam National University, Korea)
Youngnam Han (KAIST, Korea)

Millimeter Wave Communications over Relay Networks
Hatem Abbas, Khairi A. Hamdi (University of Manchester, UK)

Integrated Access Backhaul in Millimeter Wave Networks
Muhammad Nazmul Islam, Sundar Subramanian, Ashwin Sampath (Qualcomm, USA)

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NET24: WiFi Networking I

Very-High-Density (VHD) MAC Protocol for IEEE 802.11 WiFi Networks
David Tung Chong Wong, Qian Chen, Francois Chin (Institue for Infocomm Research, Singapore)

Joint Optimisation of Load Balancing and Handover for Hybrid LiFi and WiFi Networks
Xiping Wu, Majid Safari, Harald Haas (University of Edinburgh, UK)

Group Formation Enhancement for Opportunistic Networks with Wi-Fi Direct
Wael Cherif (QMIC; Qatar University, Qatar)
Muhammad Asif Khan (Qatar University, Qatar)
Fethi Filali (QMIC, Qatar)
Sanaa Sharafeddine (Lebanese American University, Lebanon)
Zaher Dawy (American University of Beirut, Lebanon)

Adaptive Rate Control and Frame Length Adjustment for IEEE 802.11n Wireless Networks
Mingwu Yao, Jilong Liu, Yueyan Qian (Xidian University, China)
Zhiliang Qiu (State Key Lab of ISN, China)
Kyung Sup Kwak (Inha University, Korea)

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NET25: Congestion Control

Enhanced Split TCP with End-to-End Protocol Semantics over Wireless Networks
Bong Ho Kim (Nokia Bell Labs, USA)
Doru Calin (Nokia, USA)
Insup Lee (University of Pennsylvania, USA)

Radio-Aware TCP Optimization in Mobile Network
Xipeng Zhu (BUPT, China)
Ruiming Zheng (Qualcomm Research China, China)
Dacheng Yang (BUPT, China)
Huichun Liu, Jilei Hou (Qualcomm, China)

Bandwidth Scheduling for Multipath TCP Based Concurrent Multipath Transfer
Wei Wang, Xiaoxiang Wang (BUPT, China)
Dongyu Wang (BUPT; Key Laboratory of Universal Wireless Communications, Ministry of Education, China)

WIP: Waveform Independent Congestion Control Protocol
Scott M. Pudlewski (Air Force Research Laboratory, USA)

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PHY35: 5G Physical Layer II

Hybrid-ARQ Protocol Design with Optimal Time and Power Allocation
Kaiying Sun, Weifeng Su (SUNY, Buffalo, USA)
John Matyjas, Michael Medley (AFRL Rome/NY, USA)

On Optimal Geographical Caching in Heterogeneous Cellular Networks
Berksan Serbetci, Jasper Goseling (University of Twente, Netherlands)

Caching in Base Station with Recommendation via Q-Learning
Kaiyang Guo, Chenyang Yang, Tingting Liu (Beihang University, China)

Towards the Performance Limit of Data-Aided Channel Estimation for 5G
Yoojin Choi, Dongwoon Bai (Samsung US R&D Center, USA)
Sungsoo Kim (Samsung Electronics Co., Ltd, Korea)
Jungwon Lee (Samsung US R&D Center, USA)

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PHY36: Beamforming

Low Complexity Hybrid Beamforming Based on Orthogonal Constraint and Phase Extraction
Wenjuan Pu, Xiaohui Li, Yingchao Lin, Ruiyang Yuan (Xidian University, China)

Low Complex Hybrid Beamforming for Uplink Multiuser MmWave MIMO Systems
Yazhou Zhu (Bell Labs China, Alcatel-Lucent Shanghai Bell Co., Ltd., China)
ao Yang (Alcatel-Lucent Bell Labs, China)

Beam Forming from Randomly Spaced Elements in a Linear Array
Nicholas Misiunas, Jenny Au, Chrisna Nguon, Kavitha Chandra, Charles Thompson (UMass Lowell, USA)

On the Robustness of Coordinated Beamforming to Uncoordinated Interference and CSI Uncertainty
George C. Alexandropoulos, Paul Ferrand
(Huawei Technologies France, France)
Constantinos B. Papadias
(Athens Information Technology, Greece)

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PHY37: Caching II

Cloud-Aided Edge Caching with Wireless Multicast Fronthauling in Fog Radio Access Networks
Jeongwan Koh (KAIST, Korea)
Osvaldo Simeone (NJIT, USA)
Ravi Tandon (University of Arizona, USA)
Joonhyuk Kang (KAIST, Korea)

Caching Policy Optimization for Video on Demand
Hao Wang, Shengqian Han, Chenyang Yang
(Beihang University, China)

A Contract-Based Incentive Mechanism for Data Caching in Ultra-Dense Small-Cells Networks
Shunfeng Chu, Jun Li
(Nanjing University of Science and Technology, China)
Tingting Liu (Nanjing Institute of Technology, China)
Feng Shu
(Nanjing University of Science and Technology, China)

Coded Caching and Storage Planning in Heterogeneous Networks
Thang Xuan Vu, Symeon Chatzinotas, Björn Ottersten
(University of Luxembourg, Luxembourg)

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PHY38: Signal Detection and Multiple Access

The Application of Non-Orthogonal Multiple Access in 5G Physical-Layer Multi-Region Geocast
Yi Zhang
(Xi'an Jiaotong Unviersity, China; Ecole Centrale de Nantes, France)
Tong-Xing Zheng, Qian Yang, Hui-Ming Wang, Bo Wang, Zongze Li (Xi'an Jiaotong University, China)

Asynchronous Uplink Access with FBMC-PAM for Future Wireless Systems
Maurice Bellanger (CNAM, France)
Davide Mattera, Mario Tanda
(Università di Napoli Federico II, Italy)

Power Allocation for Energy Efficiency Maximization in Downlink CoMP Systems with NOMA
Zhengxuan Liu, Guixia Kang (BUPT, China)
Lei Lei (University of Luxembourg, Luxembourg)
Ningbo Zhang
(BUPT; Science and Technology on Information Transmission and Dissemination in Communication Networks Lab, China)
Shuang Zhang (BUPT, China)

A Low-Complexity Detection Algorithm for Uplink NOMA System Based on Gaussian Approximation
Zihan Tang (Tsinghua University, China)
Jun Wang (Tsinghua University, Puerto Rico)
Jintao Wang, Jian Song (Tsinghua University, China)

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PHY39: Signal Detection and Classification

Modulation Recognition for Incomplete Ssignals through Dictionary Learning
Guangcheng Lu, Kezhong Zhang, Sai Huang, Yifan Zhang, Zhiyong Feng (BUPT, China)

Automatic Modulation Classification Based Multiple Cumulants and Quasi-Newton Method for MIMO System
Yani Nie, Xu Shen, Sai Huang, Yifan Zhang, Zhiyong Feng
(BUPT, China)

MCMC Approach to Multisensor Linear Modulation Classification
Onur Ozdemir (Draper Laboratory, USA)
Lakshmi Narasimhan Theagarajan (Syracuse University, USA)
Mohit Agarwal (Georgia Institute of Technology, USA)
Thakshila Wimalajeewa, Pramod Varshney
(Syracuse University, USA)

Machine Learning based Signal Classification using Statistical and Multiscale Entropy Features
Arnau Mata Llenas, Janne Riihijärvi, Marina Petrova
(RWTH Aachen University, Germany)

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PHY40: Positioning

Super-resolution-aided Positioning Fingerprinting based on Channel Impulse Response Measurement
Yi-Jie Lin, Po-Hsuan Tseng
(National Taipei University of Technology, Taiwan)
Yao-Chia Chan (UC Irvine, Taiwan)
Guan-Sian Wu
(National Taipei University of Technology, Taiwan)

A Simple Angle of Arrival Estimation System
Ahmed Badawy (Politecnico di Torino, Italy)
Tamer Khattab (Qatar University, Qatar)
Daniele Trinchero (Politecnico di Torino, Italy)
Tarek M. Elfouly, Amr Mohamed (Qatar University, Qatar)

Differential Multidimensional Scaling for Self-localization of TDOA Sensor Networks
Johannes Schmitz (RWTH Aachen University, Germany)
Sivan Toledo (Tel-Aviv University, Israel)
Roberto Carlos Hincapie
(Universidad Pontificia Bolivariana, Colombia)
Saeed Shojaee, Vimal Radhakrishnan, Rudolf Mathar
(RWTH Aachen University, Germany)

Sensitivity Analysis of Localization Using Discrete Astronomical Radio Sources
Ali Gaber Mohamed Ali (Virginia Tech, USA)
R. Henry Tillman
(Johns Hopkins University Applied Physics Lab, USA)
Michael Buehrer, Steven Ellingson (Virginia Tech, USA)

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EMG15: Networking II

Efficient Elephant Flow Detection and Scheduling through Correlation-Based Classification
Lu Li, Feilong Tang (Shanghai Jiao Tong University, China)
Yanqin Yang (East China Normal University, China)

Convex Hull Inspired Distributed Controller Placement for Assisting D2D Transfers in LTE-A Networks
Naveen Kumar, Siba Narayan Swain,
Siva Ram Murthy Chebiyyam (IIT Madras, India)

Integrating Variability Management in Data Center Networks
Zina Chkirbene, Sebti Foufou, Ridha Hamila
(Qatar University, Qatar)

Heterogeneous Software-Defined Networks: Implementation of a Hybrid Radio-Optical Wireless Network
Muhammad Saad Saud, Helal Chowdhury, Marcos D. Katz
(University of Oulu, Finland)

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MAC20: 5G MAC II

Distributed MAC Scheduling Scheme for C-RAN with Non-Ideal Fronthaul in 5G Networks
Min Huang, Xu Zhang (Intel Labs China, China)

A Novel Random Access Scheme Based on Successive Interference Cancellation for 5G Networks
Yanan Liang, Xu Li, Jiayi Zhang, Ying Liu
(Beijing Jiaotong University, China)

Heterogeneous QoS-Driven Resource Allocation Over MIMO-OFDMA Based 5G CR Networks
Jingqing Wang, Xi Zhang (Texas A&M University, USA)

Pre-scheduled Resources for Retransmissions in Ultra-Reliable and Low Latency Communications
Renato Barbosa Abreu, Preben Mogensen, Klaus Pedersen
(Aalborg University, Denmark)

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MAC21: Cellular Systems

Distributed Power Control for D2D Communications Underlaying Cellular Network Using Stackelberg Game
Guodong Zhang, Jinming Hu, Wei Heng, Li Xiang,
Wang Gang (Southeast University, China)

Energy-Efficient Resource Allocation in Cellular Network with Ambient RF Energy Harvesting
Yisheng Zhao (Fuzhou University, China)
Victor C.M. Leung (University of British Columbia, Canada)
Xinghua Sun
(Nanjing University of Posts and Telecommunications, China)
Zhonghui Chen (Fuzhou University, China)
Hong Ji (BUPT, China)

Uplink/Downlink Matching Based Resource Allocation for Full-Duplex OFDMA Wireless Cellular Networks
Tam Tran (INRS, Canada)
Vu Nguyen Ha, Long Bao Le
(INRS, University of Quebec, Canada)
Andre Girard (INRS-EMT and GERAD, Canada)

Optimal Base Station Density in Cellular Networks with Self-similar Traffic Characteristics
Congshan Fan, Tiankui Zhang, Zhimin Zeng (BUPT, China)
Yue Chen (Queen Mary University of London, UK)

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NET26: Millimeter Wave and MIMO Networks

Pseudo Lateration: Millimeter-Wave Localization Using a Single RF Chain
Joe Chen (Rice University, USA)
Daniel Steinmetzer, Jiska Classen (TU Darmstadt, Germany)
Edward W. Knightly (Rice University, USA)
Matthias Hollick
(TU Darmstadt; Secure Mobile Networking Lab, Center for Advanced Security Research Darmstadt, Germany)

User Association in 5G mmWave Networks
Sanjay Goyal (InterDigital Communications, USA)
Marco Mezzavilla (NYU Poly, USA)
Sundeep Rangan (New York University, USA)
Shivendra Panwar
(Polytechnic Institute of New York University, USA)
Michele Zorzi (Università degli Studi di Padova, Italy)

Hybrid Beamformers Design for MIMO Relay Networks in Millimeter Wave
Hatem Abbas, Khairi A. Hamdi (University of Manchester, UK)

Adaptive Pilot Allocation Algorithm for Pilot Contamination Mitigation in TDD Massive MIMO Systems
Makram Alkhaled, Emad Alsusa, Khairi A. Hamdi
(University of Manchester, UK)

Wednesday, 22 March 2017 | 14:40 – 16:00 • Pacific O

NET27: WiFi Networking II

Fine-Grained Radio Resource Management to Control Interference in Dense Wi-Fi Networks
Mirghiasaldin Seyedebrahimi
(Birmingham City University, UK)
Faycal Bouhafs, Alessandro Raschellà, Michael Mackay,
Qi Shi (Liverpool John Moores University, UK)

Bluetooth and IEEE 802.11n System Coexistence in the Automotive Domain
Alaa Mourad (BMW AG & University of Kiel, Germany)
Peter A. Hoeher (University of Kiel, Germany)
Siraj Muhammad (University of Oklahoma, USA)
Mohamad Omar Al Kalaa (University of Oklahoma)
Hazem Refai (Oklahoma University, USA)

Using Empirically Validated Simulations to Control 802.11 Access Point Density
Tanguy Kerdoncuff
(Institut Mines Telecom, Telecom Bretagne, France)
Alberto P Blanc (Telecom Bretagne, France)
Nicolas Montavont
(Institut Mines Telecom; Telecom Bretagne, France)

Collision-free Channel Assignment is Possible in IEEE802.11-based Wireless Mesh Networks
Takuya Yoshihiro, Takahiro Noi (Wakayama University, Japan)

Wednesday, 22 March 2017 | 14:40 – 16:00 • Pacific K

NET28: Spectrum Management

Matching-Theory-based Spectrum Utilization in Cognitive NOMA-OFDM Systems
Xue Li, Wenjun Xu, Zhiyong Feng, Lin Xue Hong, Jiaru Lin
(BUPT, China)

Hybrid Channel Assembling and Power Allocation for Multichannel Spectrum Sharing Wireless Networks
Chabalala S. Chabalala, Fambirai Takawira
(University of the Witwatersrand, South Africa)

Power Efficient Downlink Resource Allocation for Hybrid RF/VLC Wireless Networks
Mai Kafafy, Yasmine Fahmy (Cairo University, Egypt)
Mohamed M. Abdallah (HBKU, Qatar)
Mohamed Khairy (Cairo University, Egypt)

Globally-Aware Allocation of Limited Bandwidth in Multipath Routing based on Queueing Performance
Junxiao He, Oliver Yang (University of Ottawa, Canada)

Wednesday, 22 March 2017 | 14:40 – 16:00 • Pacific N

NET29: Scheduling in Wireless Networks

Novel User Scheduling Algorithms for Carrier Aggregation System in Heterogeneous Network
Tiejun Lv, Chenchen Liu, Hui Gao (BUPT, China)

Optimal Satellite Scheduling with Critical Node Analysis
Zeqi Zhang, Chunxiao Jiang (Tsinghua University, China)
Song Guo (University of Aizu, Japan)
Zuyao Ni, Yong Ren (Tsinghua University, China)

Sink-Based Centralized Transmission Scheduling by Using Asymmetric Communication and Wake-up Radio
Masanari Iwata, Suhua Tang, Sadao Obana
(University of Electro-Communications, Japan)

PF Scheduling in Hybrid Full Duplex System: Upper Bound and Simple Algorithms
Jin-Taek Lim, Jimin Bae (KAIST, Korea)
Yonghoon Choi (Chonnam National University, Korea)
Youngnam Han (KAIST, Korea)

Wednesday, 22 March 2017 | 14:40 – 16:00 • Pacific H

NET30: Performance Evaluation

Experimental Evaluation and Analysis of F-RIT low Power MAC Protocol Complied with IEEE 802.15.4e
Ryota Okumura, Jun Fujiwara, Keiichi Mizutani,
Hiroshi Harada (Kyoto University, Japan)

Evaluation of Multi-hop Packet Prioritization for Decentralized Congestion Control in VANETs
Sebastian Kuehlmorgen (TU Dresden, Germany)
Andreas Festag
(Fraunhofer Institute for Transportation and Infrastructure Systems IVI; NEC Europe, Germany)
Gerhard Fettweis (TU Dresden, Germany)

Impact of Hardware Impairments on TWRN and OWRN AF Relaying Systems with Imperfect Channel Estimates
Anoop Kumar Mishra, Sindhu C M Gowda, Poonam Singh
(National Institute of Technology, Rourkela, India)

A Comparison of Control-channel Schemes in OSA Networks using a Configurable Testbed
Jae-Kark Choi, Camillo Gentile (NIST, USA)

Wednesday, 22 March 2017 | 14:40 – 16:00 • Pacific G

PHY41: Source/Channel Coding

Cube-Split: Structured Quantizers on the Grassmannian of Lines
Alexis Decurninge (Huawei Technologies, France)
Maxime Guillaud
(Huawei Technologies, Mathematical and Algorithmic Sciences Lab, France)

On Real-Time Status Updates over Symbol Erasure Channels
Parimal Parag (Indian Institute of Science, India)
Austin Taghavi, Jean-Francois Chamberland
(Texas A&M University, USA)

Differential Encoding for Real-Time Status Updates
Sanidhay Bhambay, Sudheer Poojary, Parimal Parag
(Indian Institute of Science, India)

A Study on Variable Length Channel Coding for State Feedback in Wireless Control Systems
Yosuke Miwa, Kentaro Kobayashi, Hiraku Okada,
Masaaki Katayama (Nagoya University, Japan)

Wednesday, 22 March 2017 | 14:40 – 16:00 • Pacific M

PHY42: Equalization, Detection and Signal Processing III

On Improving the BLER for ML Receivers in Block Faded Channels through Random Phase Rotation
Sriram P, Vignesh Kumar (IIT Madras, India)
Arun Ayyar (Sante Fe Research Pvt Ltd);
K Giridhar (IIT Madras, India)

Identifying the Full-Diversity Solution of MIMO Detection: A Fine-Grained Approach
Yuan Qi, Rongrong Qian, Chunjing Hu (BUPT, China)

Blind Identification of MIMO-SFBC Signals Over Frequency-Selective Channels
Mingjun Gao, Yongzhao Li (Xidian University, China)
Tao Li
(Xidian University; State Key Laboratory of Integrated Services Networks, China)
Xiaofeng Lu, Hailin Zhang (Xidian University, China)

Blind Carrier and Sampling Frequency Offsets Estimation in OFDM System
Li Xiang, Jinming Hu, Wei Heng, Yu Fenyan, Wang Gang
(Southeast University, China)

Wednesday, 22 March 2017 | 14:40 – 16:00 • Pacific L

PHY43: Visible Light Communication

Visible Light Communications Using Spatial Summing PAM with LED Array
Jingbo Du, Wei Xu, Hua Zhang, Chunming Zhao
(Southeast University, China)

Reconciling Approaches to SNR Analysis in Optical Wireless Communications
Michael Rahaim, Thomas DC Little
(Boston University & NSF Smart Lighting ERC, USA)

Discrete Input Signaling for MISO Visible Light Communication Channels
Mohamed Arfaoui (Texas A&M University; KAUST, Qatar)
Zouheir Rezki (University of Idaho, USA)
Ali Ghrayeb (Texas A&M University, Qatar)
Mohamed-Slim Alouini (KAUST, Saudi Arabia)

Asymptotic Performance Analysis of Multiuser Diversity in Free Space Optical Communication Systems
Yazan H. Al-Badarneh, Costas N Georghiades, Carlos Mejia
(Texas A&M University, USA)

Wednesday, 22 March 2017 | 14:40 – 16:00 • Pacific D

PHY44: Interference Management

Iterative MIMO Subspace Detection based on Parallel Interference Cancellation
Xiaojie Wang, Stephan ten Brink
(University of Stuttgart, Germany)

Distributed Interference Cancellation
Satya Prakash Ponnaluri, Babak Azimi-Sadjadi,
Yalin E. Sagduyu (Intelligent Automation, Inc., USA)
Wayne G. Phoel (DARPA, USA)

Tracking of a Frequency-Hopping Interferer in an OFDM System
Nikolaus Kleber, J. Nicholas Laneman
(University of Notre Dame, USA)

Optimal DoF and Closed-Form IA Design for K-User MIMO-OFDM Systems
Weihua Liu, Weihua Zhou, Ying Wang, Xingwei Li,
Yongming Wang (IIE, Chinese Academy of Sciences, China)

Wednesday, 22 March 2017 | 14:40 – 16:00 • Pacific E

PHY45: MIMO

Downlink Multi-user MIMO Transmission for Reconfigurable Antenna Systems
Israfil Bahceci, Mehedi Hasan, Bedri Cetiner
(Utah State University, USA)

Combined User Selection and MIMO Weight Calculation for AP Cooperation in Dense Wireless Networks
Mengyao Ge, John R. Barry, Douglas Blough
(Georgia Institute of Technology, USA)

Optimal Rank-constrained Transmission for MIMO under Per-group Power Constraints
Silpa Sanal Nair, Ragini Chaluvadi, Srikrishna Bhashyam
(IIT Madras, India)

Optimal Multi-antenna Transmission with Per-group and Joint Power Constraints
Ragini Chaluvadi, Silpa Sanal Nair, Srikrishna Bhashyam
(IIT Madras, India)

Wednesday, 22 March 2017 | 14:40 – 16:00 • Pacific F

PHY46: Modulation

Space-time Index Modulation
Swaroop Jacob (Indian Institute of Science, Bangalore, India)
Lakshmi Narasimhan Theagarajan (Syracuse University, USA)
A. Chockalingam (Indian Institute of Science, India)

Simple Calculation of Thresholds for Adaptive Modulation in Middleton Class A Noise
Hyungkook Oh, Haewoon Nam (Hanyang University, Korea)

Orthogonal Time Frequency Space Modulation
Ronny Hadani (University of Texas, Austin, USA)
Shlomo Rakib, Michail Tsatsanis, Anton Monk
(Cohere Technologies, Inc., USA)
Andrea Goldsmith (Stanford University, USA)
Andreas Molisch (USC, USA)
Robert Calderbank (Duke University, USA)

Transmission Time Analysis for Adaptive Modulation System over Block Fading Channels
Wenjing Wang, Hong-Chuan Yang
(University of Victoria, Canada)

Wednesday, 22 March 2017 | 16:20 – 17:40 • Pacific I

EMG16: Cloud, Data and Virtualization

Ensuring High-Quality Data Collection for Mobile Crowd Sensing
Hui Gao (BUPT, China)
Chi Harold Liu (Beijing Institute of Technology, China)
Ye Tian, Teng Xi, Wendong Wang (BUPT, China)

EstiTO: An Efficient Task Offloading Approach based on Node Capability Estimation in a Cloudlet
Wei-Tsung Su, Chao-Yi Kao (Aletheia University, Taiwan)

Wireless Virtualization as a Hierarchical Combinatorial Auction: An Illustrative Example
Kun Zhu
(Nanjing University of Aeronautics and Astronautics, China)
Zijing Cheng
(Beijing Institute of Satellite Information Engineering, China)
Bing Chen, Ran Wang
(Nanjing University of Aeronautics and Astronautics, China)

Wednesday, 22 March 2017 | 16:20 – 17:40 • Pacific A

MAC22: Multiple Access

Performance Modeling and Analysis of AF Relaying with Hidden Nodes
Abdurrahman Alfitouri, Khairi A. Hamdi
(University of Manchester, UK)

Hybrid Multiple Access System Based on Non Orthogonality and Sparse Code
Nam I Kim, Dong-Ho Cho (KAIST, Korea)

Fairness Oriented MAC Protocol for The Next Generation WLAN
Feiyu Chen, Bo Li, Mao Yang, Zhongjiang Yan, Xiaoya Zuo
(Northwestern Polytechnical University, China)

Selection and Dimensioning of slice-based RAN Controller for adaptive Radio Resource Management
Emmanouil Pateromichelakis
(Huawei Technologies Duesseldorf GmbH, Germany)
Chenghui Peng (Huawei Technologies co., China)

Wednesday, 22 March 2017 | 16:20 – 17:40 • Pacific C

MAC23: Power Control

Power Control and Scheduling under Hard Deadline Constraints for On-Off Fading Channels
Ahmed Ewaisha, Cihan Tepedelenlioglu
(Arizona State University, USA)

Joint User Association, Power Control and Scheduling in Multi-Cell 5G Networks
Bilal Maaz, Kinda Khawam (Université de Versailles, France)
Samer Lahoud
(ESIB, Saint-Joseph University of Beirut, Lebanon)
Jad Nasreddine (Rafik Hariri University, Lebanon)
Samir Tohme (University of Versailles, France)

Uplink Non-Orthogonal Multiple Access with Fractional Power Control
Zekun Zhang, Rose Qingyang Hu (Utah State University, USA)

MU-FuPlex: A Multiuser Full-duplex MAC Protocol for the Next Generation Wireless Networks
Qiao Qu, Bo Li, Mao Yang, Zhongjiang Yan, Xiaoya Zuo
(Northwestern Polytechnical University, China)

Wednesday, 22 March 2017 | 16:20 – 17:40 • Pacific H

MAC24: Network Performance II

A Low-latency Secure Data Outsourcing Scheme for Cloud-WSN
Jing Li, Zhitao Guan
(North China Electric Power University, China)
Xiaojiang Du (Temple University, USA)
Zijian Zhang (Beijing Institute of Technology, China)
Zhenyu Zhou
(North China Electric Power University; Waseda University, China)

A New Allocation Algorithm for Pilot Contamination Mitigation in TDD Massive MIMO Systems
Makram Alkhaled, Emad Alsusa, Khairi A. Hamdi
(University of Manchester, UK)

Enhanced Binary Search Time-Efficient mmWave Beamforming Algorithm for NLOS Environments
Yavuz Yaman, Predrag Spasojevi (Rutgers University, USA)

Wednesday, 22 March 2017 | 16:20 – 17:40 • Pacific K

NET31: Software Defined Networks I

Throughput Guaranteed Handoff for SDN-based WLAN in Distinctive Signal Coverage
Jian He, Guangxing Zhang, Zhenyu Li, Gaogang Xie
(ICT, Chinese Academy of Sciences, China)

Musubi: Improving Loss Resilience by Exploiting Multi-Radio Diversity for SDN-based WLAN
Jian He, Guangxing Zhang
(ICT, Chinese Academy of Sciences, China)
Anfu Zhou (BUPT, China)
Gaogang Xie (ICT, Chinese Academy of Sciences, China)

On Stochastic Controller Placement in Software-defined Wireless Networks
Mohammad J. Abdel-Rahman (Virginia Tech, USA)
EmadelDin A. Mazied
(Alexandria University; Sohag University, Egypt)
Allen B. MacKenzie, Scott F Midkiff (Virginia Tech, USA)
Mohamed Rizk (Alexandria University, Egypt)
Mustafa ElNainay (Alexandria University; Virginia Tech, Egypt)

Small Cell Wireless Backhaul Reconfiguration using Software-Defined Networking
Ricardo Santos and Andreas J. Kassler
(Karlstad University, Sweden)

Wednesday, 22 March 2017 | 16:20 – 17:40 • Pacific J

NET32: Power Management

Mobile Energy Sharing through Power Buddies
Eyuphan Bulut (Virginia Commonwealth University, USA)
Boleslaw K Szymanski (Rensselaer Polytechnic Institute, USA)

Optimal Beamforming and Duration/Power Allocation for Cooperative PB-enabled WPCN
Xinxin Shi, Wenjun Xu (BUPT, China)
Chia-Han Lee (National Chiao Tung University, Taiwan)
Zhiyong Feng, Jiaru Lin (BUPT, China)

Performance Analysis of Adaptive Power Technique for Cooperative Diversity Communications
Abdurrahman Alfitouri, Khairi A. Hamdi
(University of Manchester, UK)

Performance Analysis of Optimal Relay Power Control in MIMO System
Abdurrahman Alfitouri, Khairi A. Hamdi
(University of Manchester, UK)

Wednesday, 22 March 2017 | 16:20 – 17:40 • Pacific O

NET33: Mobility

Double-NAT Based Mobility Management forFuture LTE Networks
Morteza Karimzadeh (University of Twente, Netherlands)
Luca Valtulina (SpeakUp, Netherlands)
Aiko Pras, Hans van den Berg, Ricardo de O. Schmidt
(University of Twente, Netherlands)
Marco Liebsch (NEC Europe Ltd, Germany)
Tarik Taleb (Aalto University, Finland)

Impact of Mobility on the Reliability Performance of 5G Multi-Connectivity Architectures
David Oehmann (TU Dresden, Germany)
Ahmad Awada (Nokia Bell Labs, Germany)
Ingo Viering (Nomor Research GmbH, Germany)
Meryem Simsek, Gerhard P. Fettweis (TU Dresden, Germany)

A Learning Approach to Frequent Handover Mitigations in 3GPP Mobility Protocols
Cong Shen (USTC, China)
Mihaela van der Schaar (UCLA, USA)

On Medium and Long Term Channel Conditions Prediction for Mobile Devices
Xiaoli Wang (Princeton University, USA)
Edward Grinshpun (Nokia, USA)
David Faucher (Bell Labs, USA)
Sameer Sharma (Alcatel-Lucent, USA)

Wednesday, 22 March 2017 | 16:20 – 17:40 • Pacific N

NET34: Network Management

Energy-efficiency-aware Upgrade of Network Capacity
Wilfried Yoro, Mamdouh El Tabach, Taoufik En-Najjary,
Azeddine Gati (Orange Labs, France)
Tijani Chahed (Telecom SudParis, France)

Load-Adaptive Base-Station Management for Energy Reduction including Operation-Cost and Turn-on-Cost
Jiashang Liu (Ohio State University, USA)
Yang Yang (Qualcomm, USA)
Prasun Sinha, Ness B. Shroff (Ohio State University, USA)

Dynamic Allocation of Backhaul Resources for Distributed Interference Subtraction
Philippe Leroux, Aaron Callard
(Huawei Technologies Co., Ltd., Canada)

User Behavior Aware Cell Association in Heterogeneous Cellular Networks
Yao Sun, Gang Feng, Shuang Qin, Sanshan Sun, Lan Zhang
(UESTC, China)

Wednesday, 22 March 2017 | 16:20 – 17:40 • Pacific M

PHY47: Channel Measurement and Modeling

Angular Resolved Site Characterization of Non-Line-of-Sight Wireless Links
Bengt-Erik Olsson, Christina Larsson, Jonas Hansryd
(Ericsson, Sweden)

Interference-Free Pilots Insertion for MIMO-GFDM Channel Estimation
Shahab Ehsanfar, Maximilian Matthé, Dan Zhang,
Gerhard Fettweis (TU Dresden, Germany)

Dual-Polarized Channel Measurement and Modeling in Urban Macro- and Small-Cells at 2 GHz
Florian Letourneux, Thierry Tenoux, Laurent Maviel,
Julien Stephan, Yoann Corre (SIRADEL, France)
Yves Lostanlen (SIRADEL; University of Toronto, Canada)
Iyad Al Falujah, Keith Butterworth, Mark Newbury,
Matthijs Visser (Huawei, USA)

Thinning of Concentric Circular Antenna Arrays Using Improved Discrete Cuckoo Search Algorithm
Geng Sun, Yanheng Liu, Zhaoyu Chen (Jilin University, China)
Ying Zhang (Georgia Institute of Technology, USA)
Aimin Wang and Shuang Liang (Jilin University, China)

Wednesday, 22 March 2017 | 16:20 – 17:40 • Pacific L

PHY48: Bio/Nano Networks

Channel Switching in Molecular Communication Networks Through Calcium Signaling
Peng He (UESTC, China)
Tadashi Nakano (Osaka University, Japan)
Yuming Mao (SCIE, China)
Qiang Liu (UESTC, China)
Kun Yang (University of Essex, UK)

Effective Enzyme Deployment for Degradation of Interference Molecules in Molecular Communication
Yae Jee Cho, Huseyin Birkan Yilmaz
(Yonsei University, Korea)
Weisi Guo (University of Warwick, UK)
Chan-Byoung Chae (Yonsei University, Korea)

On-chip Wireless Optical Channel Modeling for Massive Multi-core Computing Architectures
Mona Nafari, Liang Feng, Josep M. Jornet
(SUNY, Buffalo, USA)

Wednesday, 22 March 2017 | 16:20 – 17:40 • Pacific E

PHY49: Coverage

The Place Coverage (TPC)- Three-stage User Association and Rate Maximization for 5G SD-RAN Systems
Shashindra Silva (University of Alberta, Canada)
Homa Eghbali (University of British Columbia, Canada)
Masoud Ardakani, Chintha Tellambura
(University of Alberta, Canada)

Impact of Model Uncertainties on the Accuracy of Spatial Interpolation Based Coverage Estimation
Nikos Perpinias, Janne Riihijärvi, Petri Mähönen
(RWTH Aachen University, Germany)

Millimeter Wave LOS Coverage Enhancements with Coordinated High-Rise Access Points
Yinan Qi, Mythri Hunukumbure, Yue Wang (Samsung, UK)

k-coverage Probability in a Finite Wireless Network
Mehrnaz Afshang, Harpreet S. Dhillon (Virginia Tech, USA)

Wednesday, 22 March 2017 | 16:20 – 17:40 • Pacific D

PHY50: Cooperative/ Relay Networks II

Achievable Rate Analysis of Two-way Full Duplex Relay with Joint Relay and Antenna Selection
Jie Hu, Fang Liu, Yuanan Liu (BUPT, China)

Achievable DoF for 2-user MIMO Relay Interference Channels with Outdated Channel State Information
Haobo Liang, Roger Cheng (HKUST, Hong Kong)

Exploiting Asynchronous Signaling for Multiuser Cooperative Networks with Analog Network Coding
Xuehua Zhang, Mehdi Ganji, Hamid Jafarkhani (UC Irvine, USA)

Multi-Antenna Down-link Cooperative Systems over Composite Multipath/Shadowing Channels
Eylem Erdogan, Ali Afana, Salama Said Ikki (Lakehead University, Canada)

Monday, 20 March 2017 | 10:50 – 12:10 • Ballroom A

WiFi Networks

Chair: Rick Bahr (Executive Director, SystemX Alliance; Stanford University)

10:50 – 11:10: Hybrid-Fiber-Wireless Networks - The Future of Gigabit Access

Brian Hinman (President, CEO & Co-Founder, Mimosa)

Deploying fiber to every home and business is economically challenging, as service providers worldwide have struggled with mass deployment. It's become clear that the future of access will be a hybrid of fiber and wireless technologies, where fiber provides the high-capacity backbone, and wireless bridges the last kilometer gap to subscribers. Sustaining fiber speeds through the wireless links is the technical challenge, particularly when operating in residential areas with foliage and other line-of-sight obstructions. Future 5G operators have promised millimeter wave solutions to come to the rescue, but 20+ GHz frequencies are highly attenuated through foliage, limiting their range of applications. In contrast, sub-6GHz spectrum and advanced spectrum re-use technologies will massively expand the network capacity in residential areas, while delivering true gigabit service to every home.

11:10 – 11:30: The Wi-Fi rEvolution

Sundar Sankaran (VP, Engineering, Ruckus Wireless)

A lot has happened since Wi-Fi was first introduced to consumers in 1997, and in twenty years, Wi-Fi has evolved from slow-moving connections to an incredibly adaptable connective technology. Today, the number of wireless devices has grown to 10 billion, there is one Wi-Fi hotspot for every 150 people and free Wi-Fi is available in most coffee shops and airplanes. No one would have guessed the progress that has been made in the Wi-Fi ecosystem but the process was no cake walk.

This talk will provide an overview of the IEEE standards and how the original standard, 802.11b, evolved to what it is today. Sundar will also discuss the evolution of wireless chipsets, systems and applications, including what this means for today's consumers and customers, and what we can expect for the future of Wi-Fi.

11:30 – 11:50: SONiQ: Open Platform for Whole Home Wi-Fi Coverage

James Chen (Senior Director, Marketing, Quantenna)

More and more services are being deployed over Wi-Fi on today's home networks. Existing applications such as real-time video, video conferencing, voice, and internet data traffic will join future applications such as VR/AR, telepresence, cloud gaming and others. To insure that all these services are fully supported anywhere in the home, the industry has adopted a multiple Access Point approach with the recent emergence of Google Home, Eero, and others underscoring this latest trend. However, all these solutions are closed solutions, meaning they do not interoperate with one another. This locks in the end consumer into a proprietary implementation which may not allow future upgrades such as additional access points or other protocols.

We will present SONiQ, an open software framework that that addresses this need. Specifically, SONiQ has ability to work across any backhaul technology such as Wi-Fi, Ethernet, MoCA, or even Powerline. It is highly flexible and can interface with many of today's Wi-Fi chipset solutions through a chipset translation layer. Its modular and layered architecture allows its steering, roaming algorithms to be customizable by OEMs and system integrators. Lastly, it is extensible to the cloud, where it can support the virtualization of Wi-Fi Access Point and future cross-platform roaming plans.

11:50 – 12:10: In-Home Wi-Fi Performance Monitoring and Management: Ensuring QoS across Managed and Unmanaged Devices

Metin Taskin (CTO, AirTies)

This talk will discuss how operators can identify, monitor and address issues with consumers' home Wi-Fi using cloud-based data management systems. After surveying a number of Wi-Fi challenges and introducing the elements of in-home Wi-Fi Mesh networking, the talk will show how a Mesh-based monitoring platform can arm operators with a full dashboard of detailed analytics on historical events and data, as well as real-time feedback on active Wi-Fi connections. Notably, the system can be accessed remotely, as a cloud-based application that can be used by network operations teams or by field technicians via an iPad app. The talk will also discuss how adding intelligent, mesh access points modernizes the home network by replacing the single gateway, or gateway-plus-repeater model, with smart and resilient routing. Several real-world examples from trials with multiple global operators will illustrate how this new kind of platform provides key performance data on managed and unmanaged devices. It will also showcase how this system delivers actionable, privacy-ensured insights to engineers or field technicians tasked with improving, maintaining or ensuring QoS within subscribers' homes.

Monday, 20 March 2017 | 14:40 – 16:00 • Ballroom A

5G and What It Will Enable

Chair: Steven Weber (Professor, Drexel University)

14:40 – 15:00: The Network of the Future. Thing Big. Think Faster.

Santiago Tenorio (Head, Network Strategy & Architecture, Vodafone)

Vodafone is always focused on delivering the best service to our customers, and we need to continuously expand the network to cope with in-building coverage needs, capacity demand and new services coming. The industry is moving toward site densification and porosity, and specially for 5G, latency will be the name of the game. In terms of network deployment, small cells are and will be key both in 4G and 5G, but we still need to come up with a scalable and cost effective solution (which at Vodafone we have called CrowdCell). Regarding latency, disruptive approaches need to be put in motion to cleverly store the content closer to the customer (geocaching), making sure network pieces of equipment can talk to each other in real time (meshed RAN) and minimising how far the information needs to travel to get a response back (local breakout). Additionally, we need to make the most of latest technology available, and accelerate the evolution of the new networks we are already building (NB-IoT messaging). Our vision is that any device could become a network element, so the network will be available everywhere. But to do so, new players need to step in (OpenRAN) and the business model may need to change towards a Network Over Demand approach.

15:00 –15:20: 5G Wireless Communication: Enabler for 4th Generation Industrial Revolutions

Byung Yi (Executive Vice President & CTO, InterDigital)

The rapid advancement of mobile communication technologies with unforeseeable computing power, ubiquitous broadband network, and web-based cyber world has been enabling the new hyper-connectivity among persons and things, opening the new era of 4th industrial revolution. Current wireless communication technical standardization efforts dubbed by "5G Wireless" are aiming for 100 Gigabit/sec throughputs, less than 1 msec latency and ultra-reliable connections, and one million devices/Km2 and supporting Machine Type Communication (MTC). This revolution will touch all industries and even our daily lives for good. Every industrial revolution has been triggered by new paradigm shift in all aspects of business and new technical innovations. This presentation defines the 5th generation wireless communications currently under full scale developments and tries to link with the 4th industrial revolution in every aspects of businesses. It will create opportunities redesigning the business models and processes along the new paradigm and technical challenges to meet the massive connectivity, middle-ware, data analytics, cloud resources, and service/applications. The presentation will provide a sneak-preview of our lives beyond 5G Wireless/4th Industrial Resolution era.

15:20 – 15:40: On the Evolution of NFV/SDN for 5G
Udayan Mukherjee (Fellow, Intel)
The focus of previous generations of wireless technologies was primarily on communications. The massive 3G/4G global deployment brought people around the world together, anywhere, anytime.

The 5th generation wireless technologies is about communication and computing coming together. To be more specific, 5G is about how communication transforms computing, enables a new generation of devices that offer unprecedented user experience, and brings intelligence to things we interact in our daily life. This massive technology transformation addresses various new and diverse use cases like mission critical IOT, massive IOT as well as enhance broadband, each of which has different end2end latency, throughput and bandwidth characteristics. To address these diverse needs, network has to be flexible and elastic in nature which in turn requires new ways of designing the system.

This industry session will focus on the 5G infrastructure development and specifically how NFV/SDN are playing a key role in creating flexible network platform to address diverse needs of the use cases. It will also give a short overview of technologies and systems facilitate the design of such a Network with Virtual RAN, Distributed Core, Mobile Edge Compute and Front hauls/backhauls connectivity.

15:40 – 16:00: Building a Verizon 5G Over-the-Air Communications Link
James Kimery (Director, Marketing for SDR and Wireless Research initiatives, National Instruments)
This talk will give a brief overview of the Verizon 5G specification and implementation challenges / solutions needed to establish an over-the air communications (OTA) link compliant with the Verizon spec. Both sides of the link will be shown covering both the Access Device and CPE (consumer premises equipment). This talk will feature a real-live over the air demonstration of the Verizon specification on a real working prototype and results will be shared from the initial prototyping exercise. Future work and extensions will also be presented on the way to 5G New Radio (NR).

Monday, 20 March 2017 | 16:20 – 17:20 • Ballroom A

New Wireless Paradigms

Chair: Lingjia Liu (Professor, University of Kansas)

16:20 – 16:40: Use Cases for Next Generation Wireless Systems
Dragan Samardzija (Distinguished Member, Technical Staff, Nokia Bell Labs)
In this talk, we will consider a number of novel use-cases and the corresponding communication-system requirements. We will focus on Industry 4.0 cyber-physical systems in different industrial applications, with humans either included in or excluded from the control loop. Virtual-cockpit scenarios will be analyzed, providing latency, throughput and reliability requirements. Radio-access solutions that lead to meeting those requirements, types of spectrum, system capacity and deployment analysis will be presented. We will argue in which situations the existing technologies such as WiFi or LTE would suffice and when the 5G new-radio is needed. Furthermore, the conventional versus dynamic edge-cloud architectures will be considered.

16:40 – 17:00: Secure, Robust and Low Power Wireless Sensor Networks for the IoT
Xiaolin Liu (Fellow & Kilby Innovation Center Director, Texas Instruments)
With the development outcomes of data analytics and mining showing the value of data intelligence the ultra-low-power wireless sensor networks (WSN) is getting propagated to almost every network scenarios: from connected wearables and personal area network, to connected home, factory, process flow and internet of things. WSN as a last mile network connecting to internet cloud service for data collection, actuation and fusion, faces a list of unique technical challenges: integrity of the data protection at low cost, end-2-end security support at the node level, extra-robust and interference resilience with time limitation of wireless communication in a mesh topology with a relatively large number of nodes, as well as extremely constraint power budget, accessibility and random location.

This talk describes a WSN solution for IoT which combines innovative design of embedded node level security, channel interference resilience communication protocol and most importantly the SenseAnywhere goal with adaptive power access and budget. This solution can be used in multiple network deployment scenarios including smart factory for predictive maintenance, remote monitoring for manufacturing facility, commercial building automation for energy efficiency as well as outdoor long distance grid sensors, smart parking lot, etc. WSN provides an effective tool to harvest values embedded in the data computation from IoT node, to IoT edge or IoT cloud.

17:00 – 17:20: The Impact of New Spectrum on Design and Test
Satish Dhanasekaran (Vice President & General Manager, Wireless Devices and Operators, Keysight Technologies)
Since the dawn of the cellular age, spectrum policy has driven significant engineering discipline and investment to enable our connected mobility. Providing a fundamental underlying constraint on diplexer and multiple-access topologies in 1G, spectrum issues are driving new increasing complexity in 4G and 4.5G including now 50 LTE bands, large-scale carrier aggregation, and unlicensed access. Each new generation of mobile communications has either been driven by, or enabled by spectrum policy updates. Combined with the technology, these provide both increased opportunity for the industry to change the way people use their mobile systems and new challenges for designers and operators. It can be argued that the most significant updates in spectrum policy, those related to licensing spectrum above 6GHz for mobile communications and those associated with shared access spectrum, are now upon us. The opportunities are already manifest with investment in mmWave technology across multiple disciplines. But this is new territory for the majority of cellular radio designers, most of whom have little experience with electromagnetic wavelengths shorter than 5cm. Not only do we in the technical community have to address the opportunities and challenges with the physics associated with mmWave, we also have the additional constraints that will be associated with specific policy (bands, bandwidths, power requirements, SAR, etc.). In addition, new techniques related to traditional radio and microwave frequencies will be required with emerging requirements associated with shared licensed spectrum. The impact on the design and test industry as we move these technologies from the niches to mainstream radio include the use of unprecedented semiconductor technology, new and smart antenna schemes, much much wider bandwidths, new interconnect technologies, active spectrum management, and cognitive radio. This talk will explore the impact on design and technology and some of the emerging challenges to commercializing a mobile multiple-access network in the context of the new frontier of spectrum.

Monday, 20 March 2017 | 10:50 – 12:10 • Regency AB

P1: The IoT Revolution: Challenges and Opportunities

Moderator:
Amitava Ghosh (Nokia Fellow & Head, Small Cell Research, Nokia Bell Labs)

Panelists:
Rapeepat Ratasuk (Principal Research Specialist, Nokia Bell Labs)
Jin Yang (Fellow & Principal Member, Technical Staff, Verizon)
Hao Xu (Principal Engineer & Manager, Qualcomm)
Eric Wang (Senior Specialist, Ericsson Research)
Gaurav Bansal (Senior Researcher, Toyota InfoTechnology Center)

The Internet of Things (IoT) will bring about tremendous improvements in user experience and system efficiency. It will have a transformational impact on all industries and re-shape business models and industry configurations. An estimated 50 billion connected devices will be deployed by 2020 and the total IoT revenue is expected to grow to $1.2 trillion in 2022. As a result, IoT services are expected to be a key driver for growth in the telecommunication industry.

The cellular industry has introduced many features in 4G to support IoT services including coverage and capacity enhancement, cost reduction, power consumption reduction, overhead reduction and signaling enhancement. In addition, both massive and mission-critical machine-type communications are expected to be important components of 5G.

The goal of the panel is to bring together researchers from both industry and academia, cellular service providers, and industrial partners to explore the role of 4G and 5G in IoT including requirements, business cases, emerging trends, and potential applications. The focus of the panel will be on the evolution of cellular technologies to support low-power wide-area IoT services, related requirements, commercial use cases, field experiments and performance results.

Monday, 20 March 2017 | 14:00 – 16:00 • Regency AB

P2: WiFi's Next Growth Spurt: From Teen to Adult

Moderator:
Andrea Goldsmith (Professor, Stanford University)

Panelists:
Craig Barratt (Former SVP, Google)
Sam Heidari (CEO, Quantenna)
Brian Hinman (CEO, Mimosa)
Yasamin Mostafi (Professor, UC Santa Barbara)
Metin Taskin (CTO, AirTies)

WiFi turns twenty this year, as the 802.11 protocol was first launched in September 1997. Over the past two decades WiFi has gone from a slow unreliable niche technology to a lightning-fast and ubiquitous access mechanism that now carries the majority of mobile data traffic. So what's next for WiFi? This panel will explore the emerging next-generation standard (802.11ax), multi-Gbps Wi-Fi in mmWave spectrum (802.11ad and 11ay), cloud-based network optimization, and mesh networking, as well as new applications that will be enabled by these developments.

Monday, 20 March 2017 | 16:20 – 17:40 • Regency AB

P3: Battle of the Bands: How Will Spectrum Initiatives Drive Emerging Wireless Networks?

Moderator:
Mike Honig (Professor, Northwestern University)

Panelists:
Thomas Hazlett (Hugh H. Macaulay Endowed Professor, Clemson University)
Milo Medin (Vice President, Access Services, Google)
Jon Peha (Professor, Carnegie Mellon University)
Jeffrey Reed (Willis G. Worcester Professor, Virginia Tech)
Chris Stark (Head Business Development, Nokia North America)

The evolution to 5G is expected to enable a host of new applications and services that will place increasing pressure on existing spectrum allocations. In anticipation, regulatory agencies have introduced new initiatives aimed at increasing the availability of spectrum for broadband access. The panel will address challenges and controversies associated with these initiatives and related approaches to spectrum management. At the core is the controversy over how spectrum access rights should be defined: for example, variations of licensed, unlicensed, and/or shared? Technical challenges include managing interference and designing mechanisms to encourage and facilitate efficient sharing. Additional controversies arise over possible policies that may shape, restrain, or favor potential approaches.

Tuesday, 21 March 2017 | 10:50 – 12:10 • Regency AB

P4: Evolution or Revolution: 5G Technology and What it will Enable Beyond 4G

Moderator:
John Smee (VP Engineering, Qualcomm Research)

Panelists:
Erik Dahlman (Senior Expert in Radio Access Technologies, Ericsson Research)
Byung K. Yi (Executive Vice President & CTO, InterDigital)
Santiago Tenorio (Head, Network Strategy & Architecture, Vodafone)
Geng Wu (Chief Technologist, Intel)

Fundamental requirements that have emerged for radio access networks in 2020 and beyond include massive capacity and connectivity; support for a diverse set of services, application and users, as well as flexible and efficient use of all available spectrum. In order to meet these requirements, will 5G provide a revolutionary break from previous cellular technologies, or be an incremental improvement over current 4G systems? This panel will explore the 5G technologies currently being considered, and how these technologies will come together to create the 5G network.

Tuesday, 21 March 2017 | 14:40 – 16:00 • Regency AB

P5: The Impact of NFV and SDN on Next Generation Communication Networks: Is it Real or Virtual?

Moderator:
Anthony Soong (Chief Scientist for Wireless Research & Standards, Huawei Technologies)

Panelists:
Toby Ford (AVP, Cloud Technology and Platform Architecture & Strategy, AT&T; Board Member, OpenStack)
Tetsuya Nakamura (Principal Architect, Strategy and Innovation Group, CableLabs; Former Vice Chair, ETSI NFV ISG)
Sandra Scott-Hayward (Assistant Professor, Queen's University Belfast; Vice Chair, ONF Security WG)
Vasu Subramanian (Head, Core, Cloud and Software Innovation Planning, Nokia)
There is now no dispute that the wide spread acceptance of the smart phones in the last few years is currently transforming the mobile communication networks. One aspect is related to the movement of data to the cloud so that it can be accessed from anywhere with a variety of devices. This fundamentally redefines the endpoints and time frame for which network services are provisioned. Two additional technology trends have also become paramount in the future of communication systems: Network Function Virtualization (NFV) and Software Defined Networking (SDN). Together they arguably represent the biggest advancement in the communication network architecture in the last 20 years, and are fundamentally changing how network services are provided. It is the key enabler that will allow the network to be more nimble, flexible and scalable. It gives a unique opportunity to re-architect the network to efficiently offer the services in the future. The industry has already moved strongly in this direction with the creation of OPNFV in September of 2014 to speed the commercialization of these technologies. These developments will increase the rate of innovation, equip the industry for novel business models, and speed up the development of the ecosystem that will enrich our lives. This panel will discuss the benefit that NFV and SDN will bring to a commercial deployment, the impact to the system design, key enablers, implementation hurdles and new research necessary to make these technologies real.

Tuesday, 21 March 2017 | 16:20 – 17:40 • Regency AB

P6: Promise Meets Reality: mmWave and Massive MIMO in Next-Generation Wireless Systems

Moderator:
Miguel Dajer (VP, North America Wireless R&D, Huawei)

Panelists:
Sundeep Rangan (Associate Professor, New York University)
Arogyaswami Paulraj (Emeritus Professor, Stanford University)
Amitava Ghosh (Nokia Fellow and Head, Small Cell Research, Nokia Bell Labs)
Arunabha Ghosh (Director, Advanced Wireless Technology Group, AT&T Labs)
Pingping Zong (Senior Principal Engineer, Next Generation and Standards, Intel Communication and Device Group, Intel Corporation)
Ian Wong (Senior Manager, Advanced Wireless Research Group, National Instruments)
5G is accelerating a better connected world with high data rate, low latency, high reliability and massive connections. Massive MIMO (M-MIMO) in the mmW range is considered to be one of the key technologies that will enable 5G capacity increases. How much of the hype surrounding M-MIMO is wishful thinking and how much is reality is a critical question for the future of 5G. Many challenges remain in performance evaluation and implementation. In this panel, we examine the critical issues surrounding M-MIMO for mmW, how to address those challenges and in what areas further research is needed. Panelists will address standardization and policy, M-MIMO performance in mmW, M-MIMO implementation, applicability, resulting capacity increases and investment in research. This exciting panel hopes to bring the audience a little closer to understanding this critical technology.

Wednesday, 22 March 2017 | 10:50 – 12:10 • Ballroom A

P7: Is 5G Ready for the Challenges of Emerging Markets?

Moderator:
Chaitali Sengupta (Vice President, Product Development and Engineering, Reliance Jio Infocomm)

Panelists:
Larry Alder (VP Product Definition, One Web)
Nambi Seshadri (Former CTO, Mobile and Wireless, Broadcom)
Al Hammond (Professor, Santa Clara University; Director, Broadband Institute of California)
Inderpal Mumick (Kirusa)
Deval Parikh (CEO & Executive Director, Brightstar-Beetel)
As the excitement around 5G builds, we have the opportunity of finding new ways of connecting people and "things" under a wide range of spectrum, regulatory, and commercial challenges. Should the mobile eco-system in the fast growing emerging economies continue to adapt their mobile use cases and deployments, as best as possible, based on available ITU/3GPP/IEEE standards designed primarily for perhaps another part of the world? Or is it time for new 5G standardization efforts to adapt technology to the needs of these evolving markets where the next billion mobile users are expected to come from?

In this panel, we will look at what are some of the unique drivers from local regulatory perspective, new use cases and applications that fit the needs of specific emerging markets, differences in infrastructure cost structure, and end user price sensitivity that should influence standardization efforts beyond higher bandwidths, improved coverage and higher capacity. We will discuss how spectrum allocation, regulatory factors and policy impacts implementation and deployment of networks and systems in US and Europe and compare to other nations such as India and African countries. We will cover 4G deployments around the world and how they are expected to evolve into 5G, both for higher bandwidth use cases as well as how IoT is expected to play a significant role in emerging markets.

Wednesday, 22 March 2017 | 14:40 – 16:00 • Ballroom A

P8: Look Ma, No Hands: Intelligent Transportation and the Wireless Networks that Drive It

Moderator:
Weimin Xiao (Principal Engineer, Wireless Standards, Huawei)

Panelists:
Vaibhav Garg (Systems Manager, Texas Instruments)
Ravi Puvvala (Founder & CEO, Savari)
Steven Shladover (California PATH Program Manager, UC Berkeley)
Jim Misener (Automotive Standards Activities Lead, Qualcomm)
John Kenney (Director & Principal Researcher, Toyota InfoTechnology Center)

Today's automated driving trials rely on a variety of sensors placed on vehicles to enable functions such as emergency braking and collision avoidance. Meanwhile, the automotive industry is committed to deploying communication technology to enable warning and indications to (human) drivers regarding traffic incidents and safety. But the role of 5G or cellular wireless generally is still unclear. The panel discussion will focus on how cellular communication technologies can supplement sensing and whether it is necessary to achieve the vision of driving automation.

Topics of discussion:
- What modes of communication are most suitable for automated driving vehicles: vehicle to vehicle communication, communication via infrastructure, or some combination? Advantages and limitations of each.
- What are the bandwidth hungry and delay sensitive applications in vehicular? Beyond delivery of entertainment, what role may cellular play? How can 5G support sensor sharing and remote driving? What areas do we need to improve?
- How do current standards (DSRC, LTE, LTE V2V) need to evolve to support automated driving?
- Can communication achieve better traffic flow and traffic management? Studies on platooning and some preliminary work on intersection management suggests this may be the case, but to what extent can we improve vehicular traffic throughput? Also, how does this influence human behavior? What role does cellular play in this?

Wednesday, 22 March 2017 | 16:20 – 17:40 • Ballroom A

P9: The Crazy New World Enabled by the 5G Tactile Internet

Moderator:
Gerhard Fettweis (Professor, Vodafone Chair, Mobile Communication Systems, TU Dresden)

Panelists:
Satoshi Nagata (3GPP RAN1 Chairman & Manager, NTT DoCoMo)
Charlie Zhang (Vice President, Samsung Research America)
Sanjai Kholi (Facebook)
Sailesh Chittipeddi (CTO, Integrated Device Technology)
John Smee (VP, Engineering, Qualcomm Research)

Wireless communications as known today enables to connect devices and people for exchanging content, being multimedia and/or data. The data rates of wireless communications continue to increase from generation to generation, mainly driven by innovation in electronics. With 5G an additional breakthrough is soon to happen, as the latency of communicating over the wireless network will become low enough to enable an end-to-end roundtrip delay from terminals through the network back to terminals of approximately 1-10ms. This is the response of human tactile to visual feedback control. The wireless communications network can then become the platform for enabling to control and steer real and virtual objects in many situations of our life. Almost no area of economy will be left untouched, with examples being health & care, mobility, education, manufacturing, smart grids, and many more. The Tactile Internet will become a driver for economies and innovation, and will help develop societies to a new level of sophistication. To make this happen, we must tackle many open research challenges. Hence, we want to address the challenges ahead, as well as the crazy new world enabled by having a ubiquitously available remote control network, the Tactile Internet.

Examples could be:
- Holographic phone calls (help me ObiWan). How practical is that and when will it happen?
- Personal drones not only for logistics but also for moving people, or other kinds of personal assistants. •Beyond driverless cars to driverless everything.
- Immersive 3D glasses type media. How will it be used, when will I see it, especially using cellular. So will I sit in my driverless car and think I am sitting in a grassy field in Bavaria?
- Smart city. From simple applications as controlling the smart grid, to cars that drop me off and find their own parking spot. Any imagination beyond? E.g., can we envision a city without traffic accidents? A city without the infrastructure concept of streets as today?

Tuesday, 21 March 2017 • Ballroom A

The IEEE WCNC'17 Startup City features wireless startups with potentially game-changing technology. Startup technologies and products will be exhibited in the startup booths, as well as in a "pitch" to conference delegates and a panel of distinguished judges. Awards for the most innovative startup in each technology category will be announced after the showcase.

Showcase 1: Cellular and Enterprise System Innovations

10:50 – 11:05: **Artemis Networks** (artemis.com)
11:05 – 11:20: **Luminate Wireless** (luminatewireless.com)
11:20 – 11:35: **Cohere Technologies** (cohere-technologies.com)
11:35 – 11:50: **Tarana Wireless** (taranawireless.com)
11:50 – 12:05: **Blue Danube Systems** (bluedanube.com)

Showcase 2: Wireless Network Innovations

14:40 – 14:55: **CCS** (ccsl.com)
14:55 – 15:10: **Plume WiFi** (plumewifi.com)
15:10 – 15:25: **ASSIA, Inc.** (assia-inc.com)
15:25 – 15:40: **Code On Technologies** (codeontechnologies.com)
15:40 – 15:55: **M87** (m-87.com)

Showcase 3: mmWave and Wireless Hardware Innovations

16:20 – 16:35: **Phazr** (phazr.net)
16:35 – 16:50: **Insyab-Wireless** (insyab-wireless.com)
16:50 – 16:05: **i5 Technologies** (i5-comm.com/v2)
17:05 – 17:20: **Maja Systems** (majasystems.com)
17:20 – 17:35: **Nano Semi** (nanosemitech.com)

Startup City Judges

Ahmad Bahai (CTO, Texas Instruments)
Forest Baskett (General Partner, New Enterprise Associates)
Steve Goldberg (Partner, Venrock)
Upamanyu Madhow (Professor, UC Santa Barbara)
Nambi Seshadri (Former CTO, Mobile & Wireless, Broadcom Corporation)
Theodore (Tod) Sizer (VP & Domain Leader, Wireless Research, Nokia Bell Labs)
Eric Zimits (Managing Director, Granite Ventures)

Sunday, 19 March 2017 | 09:00 – 12:15 • Pacific F

T1: Cloud RAN Overview

Presenters: Rajeev Agrawal, Anand Bedekar, Suresh Kalyanasundaram (Nokia)

Cloud Radio Access Networks (Cloud RAN) is an emerging architectural paradigm in mobile networks for both 4G as well as 5G. In conventional mobile networks, RAN baseband functionality is typically deployed at the cell sites on special-purpose hardware. In the Cloud RAN architecture, all or parts of the baseband functions are moved deeper in the network at more centralized locations, and hosted on general-purpose server hardware using virtualization technologies. Cloud RAN attempts to achieve operational efficiencies and better total-cost-of-ownership through centralization of baseband functions, pooling efficiencies for RAN baseband processing, and air-interface performance gains by fast-time-scale multi-cell coordination. In this tutorial, we will present an overall look at deployment scenarios, potential benefits, key technical challenges in the evolution of the Radio Access Network (RAN) architecture towards Cloud RAN, and solutions to overcome them. We aim to present insights and architectural principles underlying key technologies and tradeoffs that drive Cloud RAN.

A key challenge in deploying Cloud RAN is the need for high-bandwidth/low-latency transport between the central sites and cell sites, known as fronthaul. To address fronthaul limitations, we examine the implications and tradeoffs enabled by RAN functional splits on fronthaul needs, system performance, and centralization scale. We present an analysis of the impact of Cloud RAN architectures and fronthaul on performance gains achievable by multi-cell coordination, and the implications of the architecture of multi-cell coordination algorithms on deployment flexibility in a Cloud RAN environment. To maximize the use of General-Purpose Processors (GPP) and operating systems such as Linux for Cloud RAN, we examine the implications of the need to achieve real-time performance for RAN functions. To enable right-sizing the amount of compute used for various RAN functions based on the workload, we examine the principles underlying pooling and scalability for RAN functions. Cloud RAN also aims to use cloud management technologies such as virtualized infrastructure management (VIM) and orchestration for automating the instantiation and scaling of RAN functions. We look at the special needs for RAN arising from real-time constraints and a mix of GPP and non-GPP hardware. In the evolution towards 5G, we propose the use of Cloud-RAN-based multi-connectivity anchoring to address processing bottlenecks in a scalable manner. The emergence the Distributed Edge Cloud that hosts the Cloud RAN also enables a broader architectural examination of what functions may benefit from being closer to the network edge. We identify opportunities for optimization across RAN and other network layers enabled by the Distributed Edge Cloud architecture.

Sunday, 19 March 2017 | 09:00 – 12:15 • Pacific E

T2: Towards 5G: LTE, LTE-Advanced, and Beyond

Presenter: Hyung Mung (Qualcomm)

Long Term Evolution (LTE) developed by 3GPP has become the global 4th generation (4G) standard. 3GPP recently started to investigate 5G standard in Release 14. In this tutorial, we first survey the underlying techniques of 4G and 5G such as OFDMA, SC-FDMA, MIMO/Massive MIMO, fast multi-carrier resource scheduling, and millimeter wave (mmWave) radio access. Then, we give technical overview of LTE and LTE-Advanced. We also survey upcoming 5G system design and timeline of 5G standardization within 3GPP. The audience will learn about key technologies of 4G & candidate 5G communication systems and will obtain detailed understanding of LTE, LTE-Advanced, and candidate 5G systems.

Sunday, 19 March 2017 | 09:00 – 12:15 • Pacific D

T3: Signal Processing for Millimeter Wave Wireless Communications

Presenters: Robert Heath (University of Texas, Austin)
Nuria González-Prelcic (Universidad de Vigo)

Communication at millimeter wave (mmWave) frequencies is defining a new era of wireless communication. The mmWave band offers much higher bandwidth communication channels than presently used in commercial wireless systems. Wireless local area networks are already exploiting the 60 GHz mmWave band, while 5G cellular systems are likely to operate at other mmWave frequencies. Because of the large antenna arrays, different channel models, and new hardware constraints, signal processing is different in mmWave communication systems. This tutorial will provide an overview of mmWave wireless communication from a signal processing perspective. Topics covered include propagation models and the presence of sparsity in the channel, power consumption and resulting hardware constraints, MIMO techniques in mmWave including beam training, hybrid beamforming, MIMO with low-resolution analog-to-digital converters, and channel estimation. Millimeter wave communication is a topic of extreme interest right now in the signal processing and communication theory communities. We also note it is a significant area of interest for the US Government, with the FCC just releasing a notice of inquiry for using mmWave spectrum for mobile communication and suggesting potential spectrum. This tutorial opens the door to future applications of mmWave to cellular, transportation, massive MIMO, and wearables, reviewing as well current applications in WLAN. We believe that our tutorial is very timely given the growing interest in mmWave for cellular communication in particular.

Sunday, 19 March 2017 | 09:00 – 12:15 • Pacific I

T4: A Hands-on Guide to US Spectrum Policy and Regulations for Wireless Innovators

Presenters: Michael Marcus (FCC (retired); Virginia Tech)
Anne Linton Cortez (Washington Federal Strategies)

Around the world spectrum technologies are regulated much more than most other technologies in the IEEE community. In particular, innovative technologies often need non-routine regulatory approvals. Ignoring those regulatory approvals that can severely delay or even block market access. Such technologies might involve new bands or novel ways of sharing spectrum on a non-interfering basis with existing users. This tutorial will explain the basics of international and US spectrum policy so that innovators can identify any serious relevant regulatory issues early. It will also explain the various routine and nonroutine approvals that might be needed such as experimental licenses, equipment authorization, waivers, service rules, and commenting on FCC proposals. Possible tactics for impacting policy will be discussed. Bands discussed will range from VHF to the WRC-19 proposal that goes to 450 GHz.

Sunday, 19 March 2017 | 09:00 – 12:15 • Pacific O

T5: IEEE 802.11ax: High Efficiency Wireless LAN (HEW)

Presenters: Osama Aboul-Magd (Huawei Technologies; Chair, IEEE 802.11ax)
Edward Au (Huawei Technologies; Chair, IEEE 802.11ay)

In the recent years there has been an increased dependence on Wi-Fi technology as the main tool for accessing the Internet. Several factors have contributed to this trend. In addition to the ubiquitous availability of Wi-Fi interfaces on mobile devices and the ease of use of the technology, the most prominent factor is the almost free availability of Wi-Fi connectivity in coffee shops, hotels, convention centers, etc. The increased use of Wi-Fi technology has manifested itself in a phenomenal increase of traffic crossing Wi-Fi facilities driven mainly by growth in video traffic. Further, the traditional environments (use cases) where Wi-Fi is deployed have also changed. WLAN deployments have migrated from its traditional markets in enterprise and consumer electronics to carrier and service providers deployments for data offloading and deployments that are characterized by large number of users and large number of devices (access points) in a closed and limited geographical area such as airports and sports events taking place in public stadiums, i.e., dense deployments.
To meet the new challenges a further increase in the supported data rates may be difficult to achieve due to technology limitations and may not be very helpful. In the year 2013 the IEEE 802.11 Working Group embarked on a new project to improve Wi-Fi users' experience and deal with the dense deployment scenarios. The name of the project is high efficiency WLAN (HEW) and is also known as IEEE 802.11ax. The scope of this new project deviates from the scopes of previous projects, e.g. IEEE 802.11n and IEEE 802.11ac, in that it focuses on the improvements of the per-user throughput rather than the aggregated link throughput.

This tutorial provides an overview of the work progressing at the IEEE 802.11 related to high efficiency WLAN (HEW) or IEEE 802.11ax amendment. The IEEE 802.11ax is the next in the Wi-Fi standard series after the successful deployments of IEEE 802.11n and IEEE 802.11ac. IEEE 802.11ax is expected to introduce new features to the WI-Fi industry such as OFDMA and UL MU MIMO. In particular, a new OFDMA PHY layer is introduced together with the supporting MAC features.

Sunday, 19 March 2017 | 09:00 – 12:15 • Pacific N

T6: Molecular Communication: System Models, Fundamental Limits, and Experimental Implementations

Presenters: Nariman Farsad (Stanford University)
Chris Rose (Brown University)

This tutorial introduces the emerging field of molecular communication wherein chemical signals are used to connect "tiny" machines such as synthetic biological devices and swarms of micro-scale robots. We begin by presenting some of the recent advances in system biology, nanotechnology, and bioengineering which have led to the creation of many different tiny machines in a laboratory setting. Such devices could find application in in-body communication, data storage, and infrastructure monitoring in smart cities/industrial complexes and sensor networks for homeland security. Practical deployment of these devices is only possible if they can communicate and collaborate, but the medium at these size scales is often hostile to more standard electromagnetic and acoustic forms of communication. Molecular communication is thus proposed as an attractive solution. Next, we discuss some of the different molecular communication system models developed over the past decade, all of which have three basic components: the Transmitter, the Propagation Channel, and the Receiver. We start from the transmitter and present different schemes by which information can be delivered by chemical signals. Then, different propagation mechanisms such as flow, active transport and various forms of random walks are presented. Receiver models, such as ligand receptors, are introduced and optimal detection algorithms discussed. We then consider fundamental capacity limits of molecular timing/concentration/payload-encoded molecular channels. The tutorial concludes with a discussion of the recent experimental implementations of molecular communication, and some of the most important open problems in this exciting new area.

Sunday, 19 March 2017 | 09:00 – 12:15 • Pacific J

T7: Hacking Network Coding for 5G Systems

Presenters: Frank Fitzek, Sreekrishna Pandi, Juan Cabrera (Technical University of Dresden)

5G communication systems are just around the corner. But the new technical requirements in latency, throughput, security, and resilience together with new architectures such as multi path, mesh, or multi hop, will request for new technologies. One of those new technologies is Network Coding, which has raised a lot of interest in the research community lately and first attempts in standardization bodies are taking place to integrate this ground breaking technology in commercial products. This tutorial will give a short introduction to network coding with respect to 5G, but the main focus is to enable the audience to implement their own ideas either in simulations or in real testbeds. Therefore, the tutorial organizers will present their own software library for network coding. The software library comes with a small simulation environment to test out first simple relaying topologies. The tutorial will show how to embed the software library and to do the parameterization for different scenarios. Understanding the impact of different parameter choices are of critical importance in order to successfully deploy network coding in real networks and on real devices. Throughout the tutorial participants will gain hands-on experience with the impact of key parameters such as finite field size, generation size and systematic coding. The tutorial will also show how to implement the software on commercial platforms. Some demonstrators of network coding will be available showing the full potential of network coding in larger testbeds.

The goal of the tutorial is that each participant understands the basic functionality of network coding and is able to integrate network coding in own projects.

Sunday, 19 March 2017 | 13:45 – 17:00 • Pacific F

T8: Massive MIMO: Theory and Practice

Presenters: Thomas L. Marzetta (Nokia)
Ove Edfors (Lund University)

Massive MIMO is emerging as the most compelling fifth generation wireless technology. Perhaps the ultimate embodiment of Multiple-Input Multiple-Output communications, Massive MIMO utilizes a large number of individually controlled, physically small, low power antennas to create parallel virtual circuits over the full spectrum between the base station and a multiplicity of single antenna users. Area spectral efficiency (bits/second/Hertz/square-kilometer) improvements over 4G technologies may range from ten to one-thousand, depending on the mobility of the terminals. Other benefits include energy efficiency (bits/Joule) gains in excess of one-thousand, and simple and effective power control that yields uniformly great service throughout the cell. Crucial to the scalability of Massive MIMO is its reliance on directly measured - rather than assumed - channel characteristics. The large number of service antennas, and the resulting channel hardening, makes the analysis and control of multi-cellular Massive MIMO systems surprisingly straightforward. Tractable capacity lower bounds account for receiver noise, channel estimation error, the overhead associated with pilot signals, power control, imperfections of the multiplexing or de-multiplexing signal processing, non-coherent inter-cell interference, and coherent inter-cell interference due to pilot contamination. In parallel with theoretical developments, experiments have validated propagation models that are favorable to the function of Massive MIMO, and Massive MIMO test-beds are demonstrating the fundamental soundness of the concept. This tutorial provides the participants with a thorough comprehension of the fundamentals of Massive MIMO, as well as an understanding of how practical Massive MIMO systems functions. In addition, the participants will learn to discern the distinctions between a genuine Massive MIMO system, and MIMO systems that merely purport to be Massive MIMO.

Sunday, 19 March 2017 | 13:45 – 17:00 • Pacific D

T9: Network Slicing Solutions: Analysis, Design and Optimization in 5G Wireless Networks

Presenters: Marco Di Renzo (Paris-Saclay University)
Konstantinos Samdanis (Huawei EUROPEAN Research Center)
Vincenzo Sciancalepore (NEC Europe Ltd.)
Fabrizio Granelli (University of Trento)

The goal of this tutorial is to provide a comprehensive overview of network virtualization and network slicing operations through several standard definition activities carried out in the last decade. This tutorial sheds light on network slicing feasibility in the next generation mobile networks by boiling down the overhead and complexity of fully virtualized network deployments. The tutorial analyzes the state-of- the-art solutions delivering the first example of network slicing while highlighting the hardware limitations of the current solutions and the real potentiality of advanced virtualization approaches. The tutorial also provides the audience with a solid background and comprehensive description of stochastic geometry modeling by introducing key theorems, by explaining how to formulate problems from the standpoint of system-level analysis and optimization, as well as by illustrating how to use stochastic geometry for modeling and analyzing cellular networks based on the novel concept of multi-tenancy network sharing. Finally, this tutorial points out the future research directions to embrace new open-source function/resource allocation procedures in a multi-tenant virtualized network scenario.

Sunday, 19 March 2017 | 13:45 – 17:00 • Pacific E

T10: 5G Wireless Systems in Unlicensed Spectrum: Design Principles and Challenges

Presenter: Amitav Mukherjee (Ericsson Research)

Upcoming 5G wireless systems are being designed to operate across a vast swath of frequency bands, spanning licensed, shared, and unlicensed spectrum. Operation in unlicensed and shared spectrum creates considerable challenges due to uncertainty in channel access and coexistence with other technologies, which give rise to new research opportunities. This can be seen from the intense scrutiny of 5 GHz unlicensed-band technologies such as LTE-U and Licensed-Assisted Access (LAA) that need to coexist with Wi-Fi, for example. 5G systems will take this one step further by operating in unlicensed spectrum ranging from sub-1 GHz bands to millimeter-wave bands above 60 GHz. This raises a multitude of questions such as: how should unlicensed-band 5G IoT systems be designed for wide-area coverage? What kind of multi-antenna beamforming strategies are suitable for mmwave unlicensed spectrum? How will 5G coexist with other radio access technologies in unlicensed spectrum?

In order to answer the above questions, this tutorial therefore aims to provide a comprehensive overview of the state-of-the-art in 5G wireless systems design in unlicensed spectrum, including both broadband and IoT networks. We will visit the pertinent regulatory requirements, research challenges, a wide array of coexistence evaluations, on-going standardization and implementation efforts, and applications of enabling 5G technologies in unlicensed spectrum, with an emphasis on PHY/MAC design aspects.

Sunday, 19 March 2017 | 13:45 – 17:00 • Pacific O

T11: Design and Test Challenges at Microwave and Millimeter Wave Frequencies

Presenters: Sang-kyo Shin, Khouzema Unchwaniwala, Greg Jue (Keysight Technologies)

One of the most promising potential emerging wireless technologies for fifth-generation (5G) cellular is the use of large blocks of contiguous spectrum in the microwave and millimeter-wave (mmWave) frequency bands. In the US, the FCC recently opened 3.8GHz of licensed spectrum and 14 GHz of contiguous unlicensed spectrum, creating vast new possibilities for 5G applications using wide bandwidth digital modulation. At the same time, the understanding of broadband signal impairments device packaging, and antenna integration at mmWave frequencies is still in its infancy. Issues such as broadband noise, phase noise, linearity, frequency response limit the attainable EVM and link budgets, and shorter wavelengths require much tighter mechanical tolerances. A different approach to generating and analyzing signals (> 2 GHz bandwidth) will be required to meet very wideband requirements allowed by these new spectrum allocations. Simulation and modeling also play a bigger role in investigating these new technologies, as well as to provide new design and test methodologies for systems and circuit designs. All of these challenging issues will be explored in this tutorial, along with new Design & Test approaches to address them, in order to explore the vast possibilities of the mm-wave frequency frontier.

Sunday, 19 March 2017 | 09:00 – 12:15 • Pacific A

Green and Sustainable 5G Wireless Networks (GRASNET 2)

09:00 – 09:35: Keynote Session I

Luiz Da Silva
When Mobile Operators Share Their Networks: Network Planning, Energy Considerations, and Performance Efficiences

09:35 – 10:30: Green I: Energy Efficient Wireless Networks

Energy-efficient SON-based User-centric Backhaul Scheme
Mona Jaber (University of Surrey, UK)
Muhammad Ali Imran (University of Glasgow, UK)
Rahim Tafazolli (University of Surrey, UK)
Anvar Tukmanov (BT, UK)

Switch-On/Off Policies for Energy Harvesting Small Cells through Distributed Q-Learning
Marco Miozzo, Lorenza Giupponi (CTTC, Spain)
Michele Rossi (University of Padova, Italy)
Paolo Dini (CTTC, Spain)

Energy-aware User Association in Energy-Cooperation Enabled HetNets
Bingyu Xu, Yue Chen, Jesus Requena Carrion
(Queen Mary University of London, UK)
Qiang Ni (Lancaster University, UK)
Tiankui Zhang (BUPT, China)

10:45 – 11:20: Keynote Session II

Mohamed-Slim Alouni
Energy Procurement for Cellular Networks with Uncertain Renewable Energy Generation

11:20 – 12:15: Green II: Green Communication Techniques

An Energy-Efficient Technique of Kernel-Based QAM Symbol Error Probability Estimation
Pasteur Poda (Université Polytechnique de Bobo-Dioulasso, Burkina Faso)
Samir Saoudi (IMT Atlantique, France)
Thierry Chonavel
(Institut Télécom; Télécom Bretagne; Université Européenne de Bretagne, France)

Fundamentals for Energy-Efficient Massive MIMO
Earl McCune, Jr. (RF Communications Consulting; Eridan Communications, USA)

Energy Modelling and Optimization of Amplify-and-Forward Relay Transmission
Dinuka Kudavithana (University of Melbourne; CEET, Australia)
Qasim Chaudhari (CEET, Australia)
Jamie S. Evans, Brian Krongold (University of Melbourne, Australia)

Sunday, 19 March 2017 | 09:00 – 17:00 • Pacific G

Polar Coding in Wireless Communications: Theory and Implementation

09:00 – 09:50: Keynote Session I

Erdal Arikan
Polar Codes for 5G and Beyond

09:50 – 10:30: Session I

Bit-permuted Coded Modulation for Polar Codes
Saurabha Tavildar

Efficient Polar Code Construction for Higher-Order Modulation
Georg Böcherer, Tobias Prinz, Peihong Yuan, Fabian Steiner

10:45 – 11:35: Keynote Session II

Wen Tong
The Design of Polar Code for 5G Standard

11:35 – 12:15: Session II

Low-Complexity Puncturing and Shortening of Polar Codes
Valerio Bioglio, Frederic Gabry, Ingmar Land

Polar Codes for Block Fading Channels
Shuiyin Liu, Yi Hong, Emanuele Viterbo

13:45 – 14:35: Keynote Session III

Rüdiger Urbanke

14:35 – 15:15: Session III

On Efficient Decoding of Polar Codes with Large Kernels
Sarit Buzaglo, Arman Fazeli, Paul H. Siegel, Veeresh Taranalli, Alexander Vardy

Star Polar Subcodes
Peter Trifonov

15:30 – 17:00: Session IV

Fast Simplified Successive-Cancellation List Decoding of Polar Codes
Seyyed Ali Hashemi, Carlo Condo, Warren Gross

Low-complexity Receiver for Multi-Level Polar Coded Modulation in Non-Orthogonal Multiple Access
Beatrice Tomasi, Frederic Gabry, Valerio Bioglio, Ingmar Land, Jean-Claude Belfiore

A Comparison of Polar Decoders with Existing LDPC and Turbo Decoders
Alexios Balatsoukas-Stimming, Pascal Giard, Andreas Burg

Capacity-Achieving Rate-Compatible Polar Codes for General Channels
Marco Mondelli, Hamed Hassani, Ivana Marić, Dennis Hui, SongNam Hong

Concluding Panel Discussion

Sunday, 19 March 2017 | 09:00 – 17:00 • Pacific C

Energy Harvesting and Remotely Powered Wireless Communication for the IoT

09:00 – 09:30: Keynote Session I

Venkat Anantharam
Estimation and Control with Energy Harvesting Constraints

09:30 – 10:15 Invited Talks

Energy Harvesting and Wireless Power Transfer in Networked Estimation and Control
Subrakhanti Dey

Sensor Strategies for Remote Estimation under Energy Harvesting Constraints
Ayca Ozcelikkale

Guarantee the Information Timeliness in Energy Harvesting Wireless Communication Systems
Sheng Zhou

10:15 – 10:30: Invited Paper

Secure SWIPT Networks Based on a Non-linear Energy Harvesting Model
Elena Boshkovska, Nikola Zlatanov, Linglong Dai, Derrick Wing Kwan Ng, Robert Schober

10:45 – 11:15: Keynote Session II

Amin Arbabian
Radio Design for the Internet-of-Everything Era

11:15 – 11:45: Invited Papers

Performance Evaluation of Energy-Constrained Broadcast (EconCast) in Wireless Networks
Tingjun Chen, Javad Ghaderi, Dan Rubenstein, Gil Zussman

Performance of Energy-Harvesting Receivers with Batteries having Internal Resistance
Zhengwei Ni, Rajshekhar Vishweshwar Bhat, Mehul Motani

11:45 – 12:15: Invited Talks

Signal Processing Advances in Near-Field Wireless Power Transfer
Rui Zhang

Mobile Computing-and-Energy Cooperation
Kaibin Huang

13:45 – 14:15: Keynote Session III

Aylin Yener
Foundations of Energy Harvesting Wireless Communications

14:15 – 13:15: Invited Papers

Online Power Control for Block i.i.d. Bernoulli Energy Harvesting Channels
Dor Shaviv, Ayfer Özgür

Wirelessly Powered Communication with Short Packets and Transmit Power Adaptation
Talha Ahmed Khan, Robert Heath, Petar Popovski

Optimal Power Allocation for Energy Recycling Assisted Cooperative Communications
George A Ropokis, M. Majid Butt, Nicola Marchetti, Luiz DaSilva

Online Transmission Policies for Cognitive Radio Networks with Energy Harvesting Secondary Users
Burak Varan, Aylin Yener

15:30 – 17:00: Paper Session

Decentralized Transmission Policies for Energy Harvesting Devices
Alessandro Biason, Subhrakanti Dey, Michele Zorzi

Throughput Maximization with an Energy Outage Constraint for Energy Harvesting Links
Hossein Shafieirad, Raviraj Adve, Shahram Shahbaz Panahi

Wireless Energy Harvesting and Communications: Limits and Reliability
Jukka Rinne, Jari Keskinen, Paul Berger, Donald Lupo, Mikko Valkama

Experiment and Modeling of Wireless-Powered Sensor Network
Dedi Setiawan, Arif Aziz, Dong In Kim, Kae Won Choi

A Markov Model Accounting for Charge Recovery in Energy Harvesting Devices
Leonardo Badia, Elisa Feltre, Elvina Gindullina

Peer-to-Peer Wireless Energy Transfer in Populations of Very Weak Mobile Nodes
Adelina Madhja, Sotiris E. Nikoletseas, Theofanis P. Raptis, Christoforos Raptopoulos, Dimitrios Tsolovos

Sunday, 19 March 2017 | 09:00 – 17:00 • Pacific H

M2M Communications and the Internet of Things

09:00 – 10:30: Opening & Keynote Session
Klaus Doppler (Nokia Research Center)

10:45 – 12:15: Session I

Throughput Efficient Large M2M Networks through Incremental Redundancy Combining
Amogh Rajanna, Mostafa Kaveh (University of Minnesota, USA)

A 5G Lightweight Connectionless Protocol for Massive Cellular Internet of Things
Marcos B.S. Tavares, Dragan Samardzija (Nokia Bell Labs, USA)
Harish Viswanathan (Alcatel-Lucent, USA)
Howard Huang (Nokia Bell Labs, USA)
Colin Kahn (Alcatel-Lucent, USA)

A Simplified Network Access Control Design and Implementation for M2M Communication Using SDN
Almulla Hesham, Fragkiskos Sardis, Stan Wong, Toktam Mahmoodi
(King's College London, UK)
Mallik Tatipamulla (F5 Networks, USA)

A Study on the Influence of M2M Gateways on the Radio Access Channel of LTE-A
Fatemah A. Alsewaidi, Angela Doufexi (University of Bristol, UK)
Dritan Kaleshi (Catapult, UK)

13:45 – 15:15: Session II

Maximum-Likelihood Detection for Energy-Efficient Timing Acquisition in NB-IoT
Harald Kroll, Matthias Korb (ACP AG, Switzerland)
Benjamin Weber, Samuel Willi, Qiuting Huang (ETH Zurich, Switzerland)

Distributed Synchronization for Massive IoT Deployments
Maria Alvarez
(Politecnico di Milano, Italy; Escuela Superior Politecnica del Litoral, Ecuador)
Umberto Spagnolini (Politecnico di Milano, Italy)

On the Performance of Spreading Random Access in Multi-cell Environment
Ameha Abebe, Chung G. Kang (Korea University, Korea)

Numerical Evaluation of Information Outage for BPSK FHSS Link Performance Analysis
Hendrik Lieske, Sebastian Rauh, Albert Heuberger
(Friedrich-Alexander-Universitat Erlangen-Nurnberg, Germany)

15:30 – 17:00: Session III

Evaluating IPv6 Connectivity for IEEE 802.15.4 and Bluetooth Low Energy
Patrik Trelsmo, Piergiuseppe Di Marco, Per Skillermark, Roman Chirikov
(Ericsson, Sweden)
Johan Ostman (Chalmers University of Technology, Sweden)

Evaluation of LPWAN Technologies for Smart Cities: River Monitoring Use-case
Wael Guibene, Johannes Nowack (Intel Labs Europe, Ireland)
Nikolaos Chalikias and Kevin Fitzgibbon
(Nimbus Centre/Cork Institute of Technology, Ireland)
Mark Kelly (Intel Labs Europe, Ireland)
David Prendergast (Intel, UK)

On the Performance Enhancement of Vehicular Ad hoc Network for Transportation Cyber Physical Systems
Danda B. Rawat (Howard University, USA)
Bhed Bahadur Bista (Iwate Prefectural University, Japan)

Security Analysis of LoRaWAN TM Join Procedure for Internet of Things Networks
Stefano Tomasin, Simone Zulian, Lorenzo Vangelista (University of Padova, Italy)

Sunday, 19 March 2017 | 13:45 – 17:00 • Pacific A

Smart Spectrum (IWSS)

13:45 – 13:50: Opening Session

13:50 – 14:30: Keynote Session
Jim Lansford (Director, Technical Standards, Qualcomm Technologies, Inc.)
Standards Bodies and Smart Spectrum Utilization

14:30 – 15:15: Session I

An Implementable Channel and CFO Estimation Scheme for IEEE 802.22-based Radio Equipment
Hiroki Ueno, Keiichi Mizutani, Takeshi Matsumura, Hiroshi Harada

Data Tracking using Frequency Offset and SIC for Physical Wireless Conversion Sensor Networks
Takehiro Sakai, Osamu Takyu, Keiichiro Shirai, Mai Ohta, Takeo Fujii, Fumihito Sasamori, Shiro Handa

Radio Environment Aware Computation Offloading with Multiple Mobile Edge Computing Servers
Koya Sato, Takeo Fujii

15:30 – 17:00: Session II

A Study on False Alarm Cancellation for Spectrum Usage Measurements
Riki Mizuchi, Kenta Umebayashi, Janne Lehtomäki, Miguel López-Benítez

Investigating the Estimation of Primary Occupancy Patterns under Imperfect Spectrum Sensing
Ahmed Al-Tahmeesschi, Miguel López-Benítez, Janne Lehtomäki, Kenta Umebayashi

Measurement technique for occupancy ratio and transition ratio in cognitive radio system
Hayato Soya, Osamu Takyu, Keiichiro Shirai, Fumihito Sasamori, Shiro Handa, Mai Ohta, Takeo Fujii

Stochastic Geometry Perspective of Unlicensed Operator in a CBRS System
Priyabrata Parida, Harpreet S Dhillon, Pavan Nuggehalli

Harm Claim Thresholds: On the Use of Extreme Value Theory for Receiver Environment Characterization
Sean Rocke

A Practical Air Time Control Strategy for WiFi in Diverse Environment
Yudong Fang, Bernard Doray, Omneya Issa

Sunday, 19 March 2017 | 13:45 – 17:00 • Pacific I

5G & Beyond – Enabling Technologies and Applications, with focus on the Tactile Internet (5G TACNET)

13:45 – 14:00: Opening Session

14:00 – 14:40: Keynote Session I
Eckehard Steinbach (Technische Universität München)

14:40 – 15:15: Keynote Session II
Emilio Calvanese Strinati (CEA-LETI)

15: 30 – 16:00: Keynote Session III
Eric Wang (Ericsson Research)

16:00 – 17:00: Technical Session

On CoMP Transmission for Device-to-device Communications in Mobile Social Network
Fan Yang, Qi Mei Cui, Min Xu (BUPT, China)

Are Today's Video Communication Solutions Ready for the Tactile Internet?
Christoph Bachhuber, Eckehard Steinbach (Technische Universität München, Germany)

Computation Caching for Local Cloud Computing
Jessica Oueis (CEA-LETI; University of Grenoble, France)
Emilio Calvanese Strinati (CEA-LETI, France)

On Modeling and QoE Evaluation of Buffered Video Streaming in Multi-Cellular Networks
Philipp Schulz, Henrik Klessig, Gerhard Fettweis (Technische Universität Dresden, Germany)

17:00: Closing Remarks

Sunday, 19 March 2017 | 13:45 – 17:00 • Pacific J

Millimeter Wave-Based Integrated Mobile Communications for 5G Networks (mmW5G)

13:45 – 13:50: Opening Session

13:50 – 14:20: Keynote Session I
Akbar Sayeed (University of Wisconsin-Madison)
Wideband (and Massive) MIMO for Millimetre-Wave Mobile Networks: Recent Results on Theory, Architectures, and Prototypes

14:20 – 15:05: mm-Wave Channel Measurements and Modelling

IField Experimental Trials for 5G Mobile Communication System Using 70 GHz-Band
Yuki Inoue, Shohei Yoshioka, Yoshihisa Kishiyama, Satoshi Suyama, Yukihiko Okumura (NTT DOCOMO, INC., Japan)
James Kepler, Mark Cudak (Nokia, USA)

An Explicit Ground Reflection Model for mm-Wave Channels
Stephan Jaeckel, Leszek Raschkowski (Fraunhofer Heinrich Hertz Institute, Germany)
Shangbin Wu (Samsung R&D Institute, UK)
Lars Thiele, Wilhelm Keusgen (Fraunhofer Heinrich Hertz Institute, Germany)

Analysis of Wide-band MIMO Measurements for the 60 GHz Band
Monisha Ghosh (University of Chicago, USA)
Sana Salous (Durham University, UK)
Yuteng Gao (Northwestern Polytechnical University, China)

15:20 – 15:50: Keynote Session II
Robert Heath (University of Texas, Austin)
Millimetre Wave Communication using Out-of-band Information

15:50 – 14:20: mm-Wave System Design Aspects

Beamforming MIMO-OFDM Systems in the Presence of Phase Noises at Millimeter-Wave Frequencies
Xiaoming Chen (Qamcom Research; Technology AB, Sweden)
Chao Fang (Chalmers University of Technology, Sweden)
Yaning Zou (TU Dresden, Sweden)
Andreas Wolfgang (Qamcom Research; Technology AB, Sweden)
Tommy Svensson (Chalmers University of Technology, Sweden)

Improved Pilot Sequences Allocation in Massive MIMO Systems
Abanoub Girgis, Bassant Abdelhamid, Salwa El-Ramly (Ain Shams University, Egypt)

14:20 – 17:00: Panel Session: Prevalent Challenges for the Adaptation of mm-Wave Technology for 5G
Panelists:
Nada Golmie (NIST)
Nuria Gonzalez Prelcic (University of Vigo)
Sundeep Rangan (NYU)
David Michelson (UBC)
Gia Khanh Tran (Tokyo Institute of Tech)

Monday, 20 March 2017 | 12:10 – 13:30 • Seacliff C **Hosted by** Center for Science of Information NSF Science & Technology Center

Student Mentorship Lunch

This event will enable students to forge future connections as well receive career development guidance from high-profile leaders in academia and industry. During this session, there will be concurrent table discussions centered around themes of interest to students such as working in industry versus academia, creating a career development plan, and the importance of networking. Students will have the opportunity to rotate every 25 minutes to participate in multiple discussions. Postdocs are also welcome.

Monday, 20 March 2017 | 14:40 – 16:00 • Market Street Foyer **Sponsored by** The Marconi Society

Student Posters and Demonstrations Session

This session is dedicated towards student posters and demonstrations. A distinguished panel of judges will select the IEEE WCNC 2017 Best Student Poster and IEEE WCNC 2017 Best Student Demonstration.

POSTERS

Digital Color Shift Keying for Higher Transmission Rate Using LED Driver with Carrier Sweeping Out
Zicheng Kang, Yusuke Matsuda, Yusuke Kozawa, Yohtaro Umeda

A Study on Hybrid PWM/DPAM Dimming Control for Digital Color Shift Keying Using RGB-LED Array
Jumpei Okumura, Yusuke Kozawa, Yohtaro Umeda

Single Input Multiple Output Antenna Investigation for Quickest Spectrum Sensing
Tifani Galuh Utami, Effariza Hanafi, Wan Amirul Wan Mohd Mahyiddin

Encryption at the Physical Layer using Subcarrier-Index Modulation over OFDM Systems
Ao Yue, Wei Li, Dongtang Ma, Longwang Cheng, Erbao Li

An Energy Efficient Optimization for Multihop Relay Networks Adopting CC-HARQ Scheme
Junmei Han, Yong Xi, Wei Li, Jibo Wei

On the Merit of Pre-coding in a Coded Faster-than-Nyquist Transmission System
Toluwanimi Fagorusi, Yi Feng, Jan Bajcsy

Information Rates of Spectrally-Efficient FDM with Faster-Than-Nyquist Transmission
Yi Feng, David Rainnie, Jan Bajcsy

Should We Discard the Dimensions of Interferences in the Interference Alignment?
Bo Pang, Yong Jin Daniel Kim

How Functional Complexity affects the Scalability-Energy Efficiency Trade-Off of HCC WSN Clustering
Merim Dzaferagic, Nicholas J. Kaminski, Irene Macaluso, Nicola Marchetti

A Physical Layer Authentication Scheme for Nonreciprocal Wireless Channels
Longwang Cheng, Wei Li, Xiaoqian Li, Ji-Bo Wei, Jing Lei

A Novel Physical Layer Encryption Scheme based on 3-D Constellation Rotation in OFDM System
Xiaoqian Li, Wei Li, Jing Lei, Longwang Cheng, Pan Zhipeng

Evaluation of Channel Estimation Methods for 5G Radio Interface with Hardware Constraint
Ture Peken, Sangkyo Shin

Dichotomic Sphere Decoder
Mohamed Achraf Khsiba, Ghaya Rekaya-Ben Othman

Blind, Joint MIMO Channel Estimation and Decoding
Thomas Dean, Mary Wootters, Andrea Goldsmith

On Feasible Deployment Alternatives for On-Demand UAV-based mmWave Access Points
Vitaly Petrov, Margarita Gapeyenko, Dmitri Moltchanov, Sergey Andreev, Yevgeni Koucheryavy

Device-to-Device Communication Underlaying Next Generation Cellular System
Divija Swetha Gadiraju, Rama Garimella

Turbo Coding and Iterative Interference Cancellation of Spectrally Efficient FDM Systems
Hedaia Omar Ibrahim Ghannam, Izzat Darwazeh

Interests Region Mining in Cellular Urban Areas: A Large-Scale Wireless Data's Approach
Peng Zhang, Haozhou Huang, Pengyu Chen, Xing Zhang

Optimised CSMA Protocol to Support Efficient Clustering for Vehicular Internetworking
Giorgia V. Rossi, Kin K. Leung

Frequency Channel Estimation for Spectrally Efficient Frequency Division Multiplexing Systems
Waseem Hazim Ozan Ozan, Paul Anthony Haigh, Izzat Darwazeh

Many-to-Many Communication Multichannel MAC Protocol for 802.11-based Wireless Networks
Pabblo C. Ghobad, Renato M. de Moraes

M2M Uplink Traffic Aggregation Optimization in LTE-Advanced Networks
Wen Feng, Hongjia Li, Ding Tang, Liming Wang, Chang Yang

Markov Modeling of Slotted Secondary Transmission and its Application to Performance Analysis
Wenjing Wang, Hong-Chuan Yang

Cooperative Energy Detection of Double Threshold
Mei Huang, Liang Yin, Shufang Li, Weijun Hong

Energy Efficient Compression and Precoding Design for Cloud Radio Access Networks
Qi Hou, Shiwen He, Qingjiang Shi, Yongming Huang, Luxi Yang

Dynamic Frequency Partitioning Scheme for LTE HetNet Networks Using Fractional Frequency Reuse
Sultan Alotaibi, Robert Akl

DEMOS

Multi-cell Coordination in Cloud RAN enabled by SDN
Dora Boviz, Mohamed Amine Dridi, Nivine Abbas, Gopalasingham Aravinthan

NetAnalyzer: A Platform for Performance Analysis Utilizing Crowdsensed Data in Cellular Networks
Pengyu Chen, Wentao Fan, Peng Zhang, Xing Zhang

Monday, 20 March 2017 | 16:00 – 18:00
Grand Ballroom Exhibit Areas (Grand Ballroom B&C & Foyer)

Student-Industry Recruiting Event

This event will enable students to discuss their job interests with industry and startup exhibitors. Students can bring their questions and resumes to the exhibit booths of the companies they are interested in. Postdocs are also welcome. Refreshments will be served.

Monday, 20 March 2017 | 18:00 – 19:30 • Market Street Foyer

Student-Industry Networking Reception

All student and industry attendees are invited to this informal mixer to meet friends and make new contacts. Postdocs are also welcome. Food and drinks will be served.

Sunday, 19 March 2017 | 18:00 – 20:00 • Atrium

Welcome Reception

You are cordially invited to enjoy fine food and drinks with your colleagues and friends at the IEEE WCNC 2017 Welcome Reception. The soaring atrium of the Hyatt creates the perfect convivial atmosphere for this kickoff to the conference.

Monday, 20 March 2017 | 12:10 – 13:30 • Atrium

Lunch (included in the conference registration)

Monday, 20 March 2017 | 13:30 – 13:45 • Grand Ballroom A

Conference Announcements / IEEE WCNC '18

Tuesday, 21 March 2017 | 12:10 – 13:30 • Seacliff C

WICE EVENT

Sponsored by intel

How to encourage Young Women in Communications Engineering - Best Practices and Experiences
Organizers:
Ana García Armada (Universidad Carlos III de Madrid)
Meryem Simsek (Technical University Dresden)
On behalf of IEEE ComSoc Women in Communications Engineering (WICE) Standing Committee

This panel will bring together interesting perspectives from the industry and academia on how to encourage and support young women that are initiating their careers in Communications Engineering. The panelists will share their own experience as well as the initiatives of their respective organizations.

This event is included in the conference registration but requires a separate registration, which can be done via the conference website.

Tuesday, 21 March 2017 | 12:10 – 13:30 • Atrium

Lunch (included in the conference registration)

Tuesday, 21 March 2017 | 13:30 – 13:45 • Grand Ballroom A

Conference Announcements / Student Paper Awards

Tuesday, 21 March 2017 | 18:30 – 22:00 • McCormicks and Kuleto's

Conference Banquet

The IEEE WCNC 2017 Organizing Committee invites you to a unique dining experience at McCormick and Kuleto's in historic Ghirardelli Square. With stunning views of the San Francico Bay and Alcatraz, our banquet will feature exquisite dining, exceptional company and the announcement of the "IEEE WCNC '17 Most Innovative Wireless Startup" awards.

Banquet attendees must have both their conference badge and their banquet ticket. Additional guests should arrive with the conference attendee who they are accompanying. Banquet tickets are included with a full registration or can be purchased separately at the registration desk subject to availability.

Buses will depart at 18:00 from Market Street Foyer entrance and return to the Hyatt Regency.

Wednesday, 22 March 2017 | 12:10 - 13:30 • Seacliff C

ComSoc Young Professionals Luncheon

Are you a graduate student or an early to mid-career career engineer or scientist in academia, industry or the start-up community looking to network with other Young Professionals? Then this is the right event for you. Are you seeking to understand how to be "successful" in your career? Then you do not want to miss this event. At this luncheon event, there will be seasoned telecommunications experts in attendance to advice on how to be successful in academia, industry and start-up.

In addition, this event provides an amble opportunity to network with regional and global young professionals and leading experts in communications. You will also be inspired by the award ceremony honoring the recipients of the IEEE ComSoc Young Professionals Best Paper and the IEEE ComSoc Young Professionals Best Innovation awards. To get our creative juice flowing, a lightning talk competition would also be featured at this event.

This event is included in the conference registration but requires a separate registration, which can be done via the conference website.

Wednesday, 22 March 2017 | 12:10 – 13:30 • Atrium

Lunch (included in the conference registration)

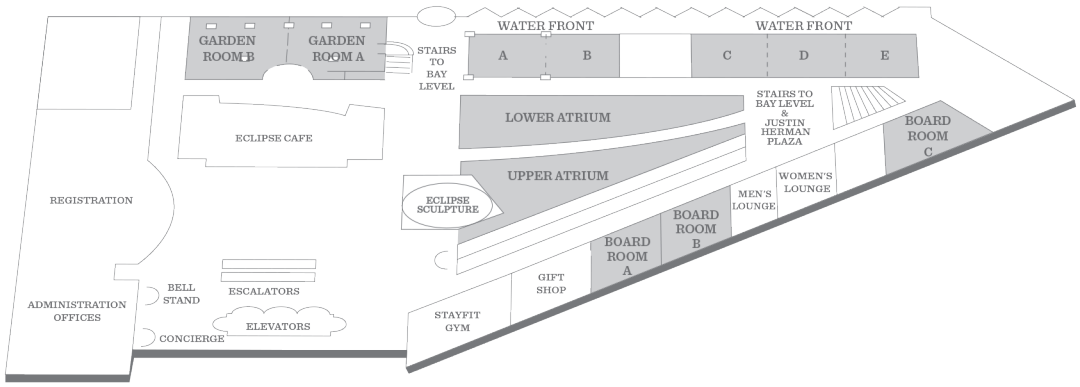
Wednesday, 22 March 2017 | 13:30 – 13:45 • Grand Ballroom A

Conference Announcements / Presentation of the IEEE WCNC'17 Most Innovative Startup Awards

Hotel Floor Plans

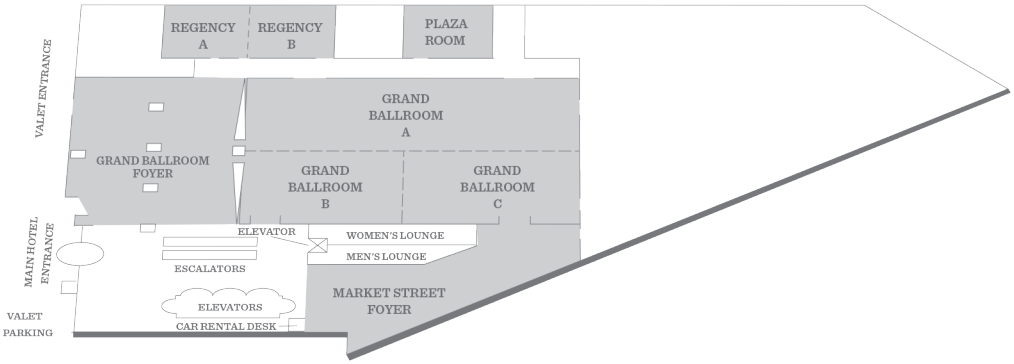
FLOOR PLAN
3-D Floor Plan

Atrium Level

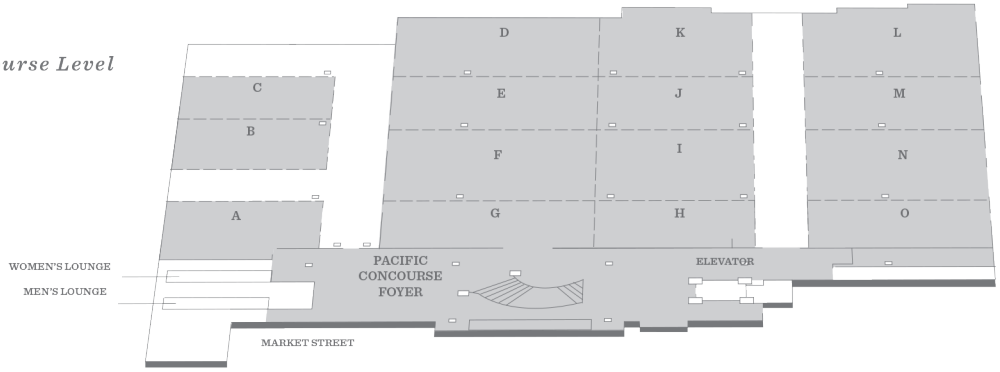


Bay Level

Street Level



Pacific Concourse Level



IEEE Wireless Communications and Networking Conference

16-18 April 2018 // Barcelona, Spain

http://wcnc2018.ieee-wcnc.org

CALL FOR SUBMISSIONS

IEEE WCNC is the premier event for wireless communications researchers, industry professionals, and academics interested in the latest development and design of wireless systems and networks. Sponsored by the IEEE Communications Society, IEEE WCNC has a long history of bringing together industry, academia, and regulatory bodies. In 2018, the city of Barcelona will become the center of the wireless world by hosting IEEE WCNC'18. The conference will include technical sessions, tutorials, workshops, and technology/business panels. You are invited to submit papers in all areas of wireless communications and networks. Potential topics include, but not limited to:

Track 1: PHY and Fundamentals

- Channel modeling, characterization and estimation
- Modulation, coding, diversity, equalization, synchronization
- OFDM, multi-carrier modulation, waveform design
- Interference modeling, management, cancellation and alignment
- PHY strategies for low-rate, sporadic and asynchronous communications
- MIMO, massive MIMO and cloud-RAN
- Cooperative, device-to-device and multi-hop communication
- Cognitive radio, spectrum sensing
- Content caching and storage in wireless networks
- PHY layer design for cellular, wireless LAN, ad hoc and sensor networks
- Energy efficient and energy harvesting PHY layer design
- Joint information and energy transmission
- PHY layer security and privacy, ultra-wideband, mmWave and sub-THz communication
- Information-theoretic aspects of wireless communications
- Signal processing for wireless communications
- Molecular and nano communications

Track 2: MAC and Cross-Layer Design

- Wireless MAC protocols for 5G: design, analysis, and optimization
- Cognitive and cooperative MAC
- MAC for mesh, ad hoc, relay and sensor networks
- Scheduling and radio resource management
- Cross-layer MAC design
- Software defined radio, RFID MAC
- QoS support and energy efficient MAC
- MAC protocol for energy harvesting wireless networks
- MAC design for multitier cellular/small cell networks
- Multiple access in machine-to-machine communication
- MAC for cloud-RAN
- MAC protocols for molecular and nano networks
- MAC protocols for mmWave networks
- Full-duplex MAC design
- Cross-layer design for massive MIMO and multiuser MIMO networks

Track 3: Wireless Networks

- Software-defined mobile/wireless networks
- Wireless Network Functions Virtualization
- Virtual network management and orchestration
- Mobile cloud
- Fog computing and networking
- Mobile Edge Computing
- Mesh, relay, sensor and ad hoc networks
- Routing in wireless networks
- Cognitive radio and networking
- Resource management and optimization
- Big Data enabled Self-Organized Networking
- Mobile big data and network data analytics
- Integrated Wireless/Optical networks
- Mobility, location, and handoff management
- Multimedia QoS and traffic management
- Wireless broadcast, multicast and streaming
- Congestion and admission control
- Wireless network security and privacy
- Mobile social networks
- Wireless network measurements and characterization

Track 4: Emerging Technologies, Architectures and Services

- Mobile/Wireless network support for vertical industries
- Adaptive content distribution in on-demand services
- Context and location-aware wireless services and applications
- User-centric networks and adaptive services
- Wireless body area networks and e-health services
- Intelligent transportation systems
- Dynamic sensor networks for urban applications
- Wireless emergency and security systems
- Ultra-reliable communication
- Enabling regulations, standards, spectrum management
- Hybrid licensed/unlicensed spectrum access schemes (e. g. licensed-assisted access)
- Technologies, architectures and enabling business models for rural communications
- Satellite-based mobile access and backhaul
- Hybrid satellite-terrestrial networks
- Full duplexing
- Joint access and backhaul schemes
- Testbed and prototype implementation of wireless services

CALL FOR TUTORIALS AND WORKSHOPS

Proposals for tutorials and workshops are solicited on hot topics for future wireless communications systems and applications.

CALL FOR PANELS

Panel proposals are also solicited on technical, business and policy-related issues and opportunities for the wireless communications industry.

Accepted and presented papers will be published in the IEEE WCNC 2018 Conference Proceedings and submitted to IEEE Xplore. See the website for requirements of accepted papers.

IMPORTANT DATES

Paper Submission Deadline:	30 September 2017
Notification of Acceptance:	15 December 2017
Camera-Ready Submission:	12 January 2018
Tutorial Proposals:	30 September 2017
Workshop Proposals:	Separate Call-for-Proposals
Panel Proposals:	30 September 2017

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