2019 IEEE 89th Vehicular Technology Conference

28 April – 1 May 2019 • Kuala Lumpur, Malaysia

IEEE VTS

VTC2019-Spring

KUALA LUMPUR

Revolutionize Vehicular Innovation

The flagship conference of IEEE Vehicular Technology Society

Final Program

22–25 September 2019
Honolulu, Hawaii, USA

IEEE VTS Connecting the Mobile World

IEEE Advancing Technology for Humanity

VTC2019-Fall HAWAII

Intelligent Connection & Transportation

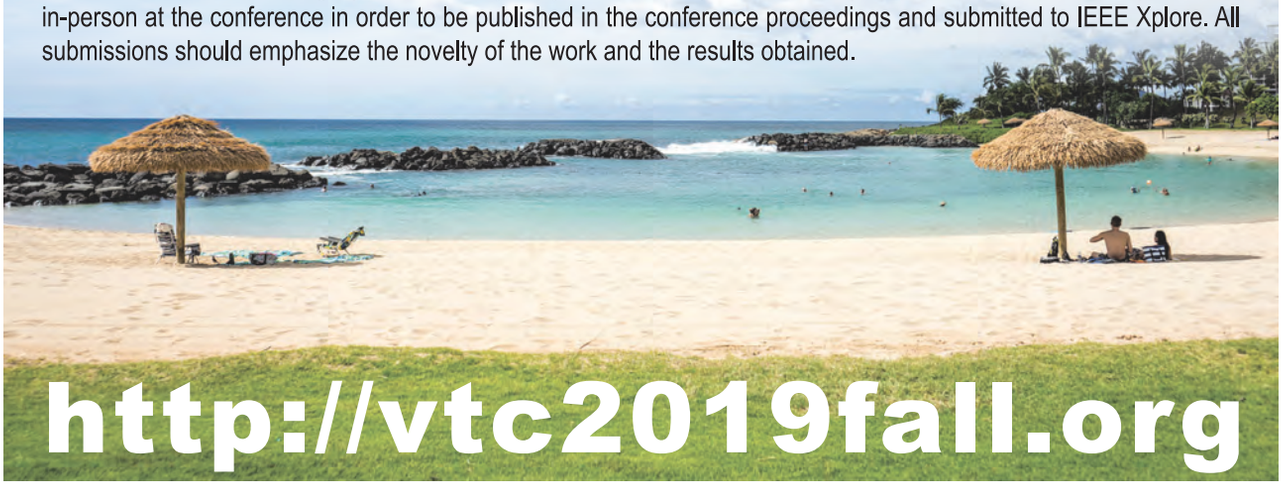
Call for RECENT RESULTS and WORKSHOP papers

RECENT RESULTS track provides rapid publication of emerging work by industry and academia. Submit an oral or poster presentation accompanied by a paper, or a demo accompanied by a short paper. A main difference from other tracks is that 2-page abstracts (with results) will be considered as well as 5-page full papers.

Submit papers by	Acceptances sent	Final papers due
17 Jun 2019	**5 Jul 2019**	**22 Jul 2019**

VTC WORKSHOPS provide invaluable opportunities for researchers and industry practitioners to share their state-of-the-art research and development results on specific areas or challenging topics. VTC attendees will be able to attend a workshop for a nominal additional fee. Workshop-only registrations will be available.

All submissions will undergo peer-review by subject matter experts. All accepted submissions must be presented in-person at the conference in order to be published in the conference proceedings and submitted to IEEE Xplore. All submissions should emphasize the novelty of the work and the results obtained.



- Unmanned Aerial Vehicle (UAV) Commun., Veh. Nets., and Telematics
- Electric Vehicles, Vehicular Electronics, and Intelligent Transportation
- Spectrum Sharing, Spectrum Management, and Cognitive Radio
- Multiple Antenna Systems and Cooperative Communications
- Radio Access Technology and Heterogeneous Networks
- Positioning, Navigation and Mobile Satellite Systems
- Signal Transmission and Reception
- Green Communications and Networks
- Future Trends and Emerging Technologies
- Antenna Systems, Propagation, and RF Design
- Wireless Networks: Protocols, Security and Services
- IoT, M2M, Sensor Networks, and Ad-Hoc Networking

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2019 89th IEEE
Vehicular Technology Conference

Final Program

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Kuala Lumpur, Malaysia

Welcome from the General Chair

It is my honor to welcome you to IEEE VTC2019-Spring, held in the vibrant city of Kuala Lumpur in Malaysia. This is the first time a major IEEE VTS event is being held in Malaysia, and no doubt, this will significantly contribute to further strengthen and develop IEEE membership and activities in the country and South-East Asia in general.

The conference venue, JW Marriot Kuala Lumpur, is ideally located at the heart of the famous Golden Triangle district, just across the road to The Pavilion—one of the many mega shopping complexes dotted around the city. It is in this pleasant environment that IEEE VTC2019-Spring Kuala Lumpur will bring together researchers, developers, practitioners, and business executives from all over the world to congregate. We hope you will take this opportunity to discover Malaysia and its rich culture.

Behind such a grand event, there is always a band of people who toil to make it happen; we thank those who have contributed tirelessly. The commitment of the Organizing Committee truly was inspirational. Special recognition is due to the Honorary Chair, Datuk Hod Parman; TPC Co-Chairs Tomoaki Ohtsuki and Hafizal Mohamad; and the rest of the member of the organizing committee who have contributed admirably to the preparation of this conference.

Last but not least, special thanks are due to our supporters and patrons for their strong and keen support. We wish all the participants a very enjoyable stay in Kuala Lumpur. We believe that this conference will be one of your most fruitful and memorable experience of your life from both professional and personal perspectives.

Nordin Ramli
General Chair, IEEE VTC2019-Spring

Welcome from the TPC Co-chairs

Our committee has organized exciting programs for IEEE VTC2019-Spring focusing on the latest research developments in wireless systems and networks, autonomous and connected vehicles, intelligent transportation, and promising new emerging topics.

The technical program consists of 60 oral sessions. The technical program committee has selected 291 outstanding papers for the oral sessions. Each paper has been reviewed by at least 3 independent reviewers. All papers presented will be published in the conference proceedings and in IEEE Xplore. In addition to the oral sessions, the conference hosts workshops, tutorials, industry panel sessions, and keynotes addressing some of the most challenging and thought-provoking aspects of wireless communications and vehicular technology. The creation of this impressive program would not be possible without the voluntary support from an outstanding team of colleagues that we thank sincerely.

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

We would also like to thank all members of the IEEE VTC2019-Spring organization committee for their support during all phases of the technical program development.

Hafizal Mohamad and Tomoaki Ohtsuki
TPC Co-chairs, IEEE VTC2019-Spring

Welcome from the VTS President

On behalf of IEEE VTS, it is truly an honor and a pleasure to welcome you to our flagship conference, VTC2019-Spring.

This year's spring event is being hosted in the world-class city of Kuala Lumpur, Malaysia. The conference will put forth an exciting collection of technical tracks presenting the latest research in all things related to vehicular technology, ten excellent tutorial sessions covering topics from NOMA to 5G to vehicular networks to machine learning/artificial intelligence, workshops focused on cutting-edge topics in vehicular technology, a world-class industry program with superb experts and practitioners, and world-renowned keynote speakers and panels providing their insights on current technologies and future trends.

Overall, VTC2019-Spring promises to provide attendees with an enriching experience that will facilitate the exchange of knowledge, enable professional development and growth, and support numerous networking opportunities with other conference attendees from around the world.

Organizing a world-class conference event involves a large and highly dedicated team of volunteers, and we are very thankful to everyone making this conference an outstanding success! I sincerely thank General Chairs Nordin Ramli and Borhanuddin Mohd Ali, Honorary Chair Hod Parman, Technical Program Chairs Hafizal Mohamad and Tomoaki Ohtsuki, and the rest of the organizing team for their time, effort, dedication, and commitment to VTC2019-Spring, a premier international event in vehicular technology!

I look forward to seeing you at VTC2019-Spring in Kuala Lumpur this April 2019, where we will be Connecting the Mobile World!

With warmest regards,
Alex Wyglinski, *President*
IEEE Vehicular Technology Society

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Registration

Registration will take place in the Mayang Sari Foyer area. Opening times are:

- Sunday 28 April 2019 7:00 - 17:30*
- Monday 29 April 2019 7:00 - 17:30
- Tuesday 30 April 2019 8:00 – 17:30
- Wednesday 1 May 2019 8:00 – 17:30

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

Breaks

Coffee breaks will take place along with exhibits in Mayang Sari Foyer.

Social Events

Lunches are included as part of the full registration and will be served in the Mayang Sari Grand Ballroom. The welcome reception will be conducted on Sunday evening, 28 April 2019 in the Mayang Sari Foyer area starting at 18:00. It will feature a showcase of Malaysian Arts and Crafts, supported by the Government of Malaysia through the Malaysia Convention and Exhibition Bureau (MyCEB). The showcase will allow delegates to experience traditional Malaysian crafts.

For IEEE Young Professionals there will be an IEEE Young Professionals Industry Forum on Smart Vehicular Safety in the Era of the 4th Industrial Revolution in Starhill 5 from 16:00 - 17:30. Visit the Registration Desk for more details

The banquet on the evening of 30 April 2019 will also be conducted in the Mayang Sari Grand Ballroom. It will begin with an early reception from 18:30-19:30, dinner to start at 19:30, and will feature entertainment of a mix of local Malaysian dances and songs that represent the multi-ethnic Malaysian community.

Lunches, the reception and banquet require admission tickets and these are included in your registration packet to gain entry. Be sure to present the correct day's lunch ticket or you will not be served. You also may purchase tickets for these events at the registration desk.

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Keynotes

Monday 29 April 2019 9:45-10:30 Mayang Sari Grand Ballroom

Opening Plenary:
Accessing From the Sky: UAV Communications for 5G and Beyond

Rui Zhang, *Dean's Chair Professor, National University of Singapore*

The integration of the dramatically increasing volume of unmanned aerial vehicles (UAVs) or drones into the future 5G and beyond wireless networks calls for a paradigm shift on the design of traditional cellular systems for terrestrial-only communications. In particular, how to realize cellular-connected UAV communications and UAV-assisted terrestrial communications are both practically appealing as well as challenging, due to the high altitude and high mobility of UAVs, the unique channel characteristics of UAV-ground links, the stringent constraints imposed by the size, weight and power (SWAP) limitations of UAVs, as well as the new degree of freedom by exploiting UAV placement/trajectory and communication co-design. Substantial research efforts from both academia and industry have been devoted to advancing this exciting new field, with remarkable progress made especially in the past couple of years. In this talk, we will provide a comprehensive overview of the state-of-the-art results on UAV-cellular integration, with a particular emphasis placed on the latest research findings on aerial-ground interference management and trajectory optimization in UAV communications. Open challenges and promising directions for future research will also be highlighted.

Dr. Rui Zhang (IEEE Fellow) received the Ph.D. degree from Stanford University in electrical engineering in 2007. He is now a Dean's Chair Professor in the Department of Electrical and Computer Engineering, National University of Singapore. His research interests include wireless information and power transfer, UAV communications, MIMO, cognitive radio, and optimization methods. He has published over 350 papers, which have been cited more than 27,000 times. He has been listed as a Highly Cited Researcher by Thomson Reuters / Clarivate Analytics since 2015, and was recognized in both Scientific Fields of Computer Science and Engineering in 2018. His work has received several IEEE awards, including the IEEE Marconi Prize Paper Award in Wireless Communications, the IEEE Communications Society Heinrich Hertz Prize Paper Award, the IEEE Signal Processing Society Best Paper Award and Donald G. Fink Overview Paper Award. He has served as an Editor for several IEEE journals, including TWC, TCOM, JSAC, TSP, etc., and as TPC co-chair or organizing committee member for over 30 international conferences. He is an IEEE Distinguished Lecturer.

Tuesday 30 April 2019 9:00-10:30 Mayang Sari Grand Ballroom

Tuesday Plenaries
Malaysian National Automotive Policy 2019

Dato' Madani Sahari, *CEO, Malaysia Automotive Institute*

Dato' Madani Sahari has more than 18 years' experience in manufacturing and service industries of the automotive sector. Dato' Madani carries with him vast experience with national and international automotive manufacturers such as Proton, Perodua, Honda, Toyota, Renault, Hyundai, Nissan and General Motors in the areas of strategic collaboration, project development and manufacturing. He graduated from the University of Lorraine (formerly Nancy-Université), France, with a degree in Industrial Technology and is also a Certified Quality Engineer. At present, Dato' Madani is the CEO of the Malaysia Automotive Institute (MAI), a focal point and coordination centre, under the custodian of the Ministry of International Trade and Industry (MITI). MAI oversees the development of the Malaysian automotive industry in all matters, including formulating of the national automotive policy, development of the local automotive roadmap and its expansion programmes, managing manpower development programme, formulating and coordinating automotive related research.

Physical-Layer Signal Processing vs. Machine Learning: Perspectives & Challenges

Haris Gacanin, *Department Head, Nokia Bell Labs*

Dr. Haris Gacanin received his Ph.D. degree in 2008 from Tohoku University, where was an assistant professor until 2010. In 2010, he joined Alcatel-Lucent (now Nokia), where he currently leads an artificial intelligence communication systems research department in Nokia Bell Labs. His professional interests are related to applications of artificial intelligence in autonomous networking. He is a Senior Member of IEICE with 180+ research publications (journals, conferences, and patents).

Wednesday 1 May 2019 9:00-10:30 Mayang Sari Grand Ballroom

Wednesday Plenaries
Artificial Intelligent Driven Solutions for Drone/UAV as a Service

Kamarul A. Muhamed, *Founder & CEO, Aerodyne Group*

Kamarul A. Muhamed has 25 years experience in digital innovation and communications. He is founder and CEO of Aerodyne, an international drone based managed solution provider with offices in Australia, Malaysia, Singapore, Indonesia, Brunei, Saudi Arabia, UAE, Denmark, America and the United Kingdom.

Cognitive Radio and AI: An Evolution

Petri Mähönen, *Head of the Institute for Networked Systems, RWTH Aachen Univ*

Prof Petri Mähönen is a full professor of networked systems and a founding director of the institute for networked systems at RWTH Aachen University. Previously he was an Ericsson Chair of Wireless Networks also at the RWTH Aachen. Before joining to RWTH Aachen in 2002, he was a professor and research director at the Centre for Wireless Communications, Finland. His research interests include cognitive wireless networks, embedded intelligence in IoT systems, theory of complex networks, future network architectures, and more generally optimized and adaptive wireless communications.

Tutorials

A range of tutorials will be held on Sunday 28 April given by experts from industry and academia.

Sunday 28 April 2019 9:00–12:30 Starhill 8

T1: Embracing Non-Orthogonal Multiple Access in Future Wireless Networks

Zhiguo Ding, Univ. of Manchester, Wei Liang Northwesten Polytechnical Univ., Jia Shi, Xidian Univ.

Non-orthogonal multiple access (NOMA) is an essential enabling technology for future wireless networks to meet the heterogeneous demands on low latency, high reliability, massive connectivity, improved fairness, and high throughput. The key idea behind NOMA is to serve multiple users in the same resource block, such as a time slot, subcarrier, or spreading code. The NOMA principle provides a general framework, where various recently proposed 5G multiple access techniques can be viewed as special cases. Recent demonstrations by industry show that the use of NOMA can significantly improve the spectral efficiency of mobile networks. Because of its superior performance, NOMA has been also recently proposed for downlink transmission in 3rd generation partnership project long-term evolution (3GPP-LTE) systems and included into the next generation digital TV standard, e.g. ATSC (Advanced Television Systems Committee) 3.0. This tutorial is to provide an overview of the latest research results and innovations in NOMA technologies as well as their applications. Future research challenges regarding NOMA in 5G and beyond are also presented.

Zhiguo Ding is a Professor in Communications at the University of Manchester. From Oct. 2012 to Sept. 2019, he has also been an academic visitor in Princeton University. Dr Ding' research interests are 5G networks, game theory, cooperative and energy harvesting networks and statistical signal processing. He is serving as an Editor for IEEE TCOM and TVT, and was an Editor for IEEE WCL and CL from 2013 to 2016. He received the best paper award in IET ICWMC-2009 and IEEE WCSP-2014, the EU Marie Curie Fellowship 2012-2014, the Top IEEE TVT Editor 2017, IEEE Heinrich Hertz Award 2018, IEEE Jack Neubauer Memorial Award 2018.

Wei Liang received the M.Sc. and Ph.D. degrees in wireless communication group from the University of Southampton, Southampton, U.K., in 2010 and 2015, respectively. From 2015 to 2018, she was currently a Research Fellow with Lancaster University, and from 2018, she is an associate professor with Northwesten Polytechnical University. Her research interests include adaptive coded modulation, network coding, matching theory, game theory, cooperative communication, cognitive radio network, non-orthogonal multiple access scheme, and machine learning.

Jia Shi received the M.Sc. and Ph.D. degrees from University of Southampton, U.K., in 2010 and 2015, respectively. He was a Research Associate with Lancaster University, U.K., from 2015 to 2017. He was a Research Fellow with 5GIC, University of Surrey, U.K., from 2017 to 2018. Since 2018, he has been with Xidian University, China, where he is currently an Associate Professor with the State Key Laboratory of Integrated Services Networks. His current research interests include mm-wave communications, non-orthogonal multiple access (NOMA) techniques, artificial intelligence, resource allocation in wireless systems, covert communications, physical layer security, etc. He is now serving as an editor for Electronics Letters, and is also serving as a guest editor for China Communications.

Sunday 28 April 2019 14:00–17:30 Starhill 8

T4: Machine Learning Radio Resource Management for Future Mobile Networks

Li-Chun Wang, National Chiao Tung University

In this tutorial, we first discuss various types of learning algorithms: supervised learning, unsupervised learning, and reinforcement learning.

Second, we examine how these learning algorithms can address the performance issues of high-capacity ultra-dense small cells in an environment with dynamical traffic patterns and time-varying channel conditions. In particular, we introduce a data-driven bi-adaptive self organizing network (Bi-SON) which can exploit the power of data-driven resource management to address the performance issues of ultra-dense small cells (UDSC).

On top of the Bi-SON framework, we will examine how a polynomial regression supervised learning, and an affinity propagation unsupervised learning algorithm can improve energy efficiency and reduce interference in system operator deployed small cells and customer plug-and-play small cells, respectively. We will also examine how reinforcement learning can improve the performance of UDSC further.

Finally, we discuss deep reinforcement learning (DRL) approaches proposed to address various challenges in modern networks which are more decentralized, ad-hoc, and autonomous in nature, such as Internet of things (IoT), vehicle-to-vehicle network, unmanned aerial vehicle (UAV) network, and heterogeneous networks (HetNet).

Li-Chun Wang (M'96 - SM'06 - F'11) received Ph. D. degree from the Georgia Institute of Technology, Atlanta, in 1996. From 1996 to 2000, he was with AT&T Laboratories, where he was a Senior Technical Staff Member in the Wireless Communications Research Department. Since August 2000, he has joined the Department of Electrical and Computer Engineering of National Chiao Tung University in Taiwan and is jointly appointed by Department of Computer Science and Information Engineering of the same university.

Dr. Wang was elected to the IEEE Fellow in 2011 for his contributions to cellular architectures and radio resource management in wireless networks. He won the Distinguished Research Award of National Science Council, Taiwan (2012). He was the co-recipients of IEEE Communications Society Asia-Pacific Board Best Award (2015), Y. Z. Hsu Scientific Paper Award (2013), and IEEE Jack Neubauer Best Paper Award (1997). His current research interests are in the areas of software-defined mobile networks, heterogeneous networks, and data-driven intelligent wireless communications. He holds 19 US patents, and have published over 200 journal and conference papers, and co-edited a book, "Key Technologies for 5G Wireless Systems," (Cambridge University Press 2017).

Sunday 28 April 2019 9:00–12:30 Bintang 2

T5: Artificial Intelligence in Wireless Signal Processing: from Compressive Sensing to Deep Learning

Yue Gao: Queen Mary University of London

Abstract—The tutorial aims to discuss the sparse signal processing in wireless communications, with particular focus on the most recent developments on compressive sensing, embedded Artificial Intelligent (AI) and Deep Learning (DL) enabled approaches from theory to practice. With sparsity property, sub-Nyquist sampling can be achieved by adopting compressive sensing. Moreover, DL has rebooted intelligent signal processing in wireless communications, such as signal detection and channel estimation. This tutorial starts from a brief introduction and general framework of sparse signal processing in wireless communications. The second part of the tutorial presents a framework for compressive spectrum sensing, which guarantees noise robustness, low-complexity, and security. Moreover, the real-world signals and data collected by the in-field tests carried out during the TV white space and millimetre-wave pilot trial will be presented to verify the algorithm designs and provide significant insights on the potential of bringing compressive spectrum sensing from theory to practice through an embedded AI approach. Then, the third part of the tutorial shows the power of DL in sparse signal processing in physical layer communications, with particular focus on signal detection and channel estimation. Finally, this tutorial will identify challenges in the DL-enabled signal processing via example of AI-enabled. cognitive radio framework. We believe this tutorial will provide audiences a clear picture on how to exploit the DL, embedded AI and compressive sensing to process wireless signals.

Dr. Yue Gao has rich experience on signal processing in wireless communication and the hardware system implementation over the past 15 years. Dr Gao is leading a team developing fundamental research into practice in the interdisciplinary area of embedded artificial intelligence by using smart antennas, sparse signal processing for spectrum sharing, Internet of Things and millimetre-wave systems. He is an Engineering and Physical Sciences Research Council Fellow from 2018 to 2023. He was a co-recipient of the EU Horizon Prize Award on Collaborative Spectrum Sharing in 2016.

Dr. Zhijin Qin has been working on sparse signal recovery, with particular focus on compressive sensing and matrix completion in wireless communications, for more than six years since her PhD. She has carried out extensive research work in the related areas from theory to practice. Many of her published journal papers in this area have been ranked as one of the most popular articles in the related journal and four of them have been ranked as the ESI highly cited paper.

Dr. Geoffrey Li has performed research in machine learning and statistical signal processing for wireless communications in the past two decades. His recent work includes sparse signal compression for channel estimation and feedback in massive MIMO networks.

Sunday 28 April 2019 14:00–17:30 Bintang 2

T6: Adversarial ML and Vehicular Networks: Strategies for Attack and Defense

Junaid Qadir, ITU; Muhammad Shafique, TU Wien; Ala Al Fuqaha, HBKU, Qatar

Machine learning (ML) has seen a lot of recent success in a wide variety of applications and industries. But despite their great success, researchers have shown that ML algorithms are easy to fool and susceptible to well-known security attacks. In particular, researchers have shown that many modern algorithms (particularly those based on deep neural networks or DNNs) are susceptible to adversarial attacks (such as a targeted misclassification attack on a self-driving car that aims to misclassify traffic signs). The increased importance of ML and AI, and the broad uptake and incorporation of these technologies in modern autonomous vehicles and vehicular networking places a premium on building robust and secure AI and ML algorithms.

Our experience with the Internet has shown that it is very difficult to retroactively embed security in systems that are not designed with security in the first place. Although ML vulnerabilities in domains such as vision, image, audio are now well-known, little attention has focused on adversarial attacks on vehicular networking ML models. For the practical success of vehicular networking, it is extremely important that the underlying technology has to be robust to all kinds of potential problems---be they accidental, intentional, or adversarial.

Our tutorial at VTC will serve to caution practitioners by discussing how the use of AI and ML in vehicular networking opens up potential security risks while also motivating the development of appropriate defenses and identifying promising directions of future work.

By the end of the tutorial, we expect that the attendees will be able to:

- Understand the major components of the ML pipeline, which will likely be used in future VANETs;
- Identify common attacks on ML models;
- Understand the dangers of adversarial machine learning in general;
- Understand the dangers of adversarial machine learning for self-driving cars and VANETS;
- Identify some promising directions for enabling robust ML

Junaid Qadir is an Associate Professor at the Information Technology University (ITU)—Punjab, Lahore. He is the Director of the IHSAN (ICTD; Human Development; Systems; Big Data Analytics; Networks Lab) Research Lab at ITU (http://ihsanlab.itu.edu.pk/). His primary research interests are in the areas of computer systems and applied ML in computer systems and networks and using ICT for development (ICT4D). He has published more than 100 peer-reviewed scholarly papers, and has given invited talks at multiple conferences (e.g., IWCMC 2017, IEEE ICOSST 2017, IEEE INTELLECT 2017).

Muhammad Shafique is a full professor (Univ. Prof.) at the Vienna University of Technology (TU Wien) since Nov. 2016. Dr. Shafique has given several Invited Talks, Tutorials, and Keynotes. He is a senior member of the IEEE and IEEE Signal Processing Society (SPS), and a member of the ACM, SIGARCH, SIGDA, and SIGBED. He holds one US patent and has (co-)authored 4 Books, 4 Book Chapters, and over 180 papers in premier journals and conferences.

Ala Al-Fuqaha is a professor with the information and Computing Technology (ICT) Division, College of Science and Engineering (CSE), Hamad Bin Khalifa University and Department of Computer Science, Western Michigan University, Kalamazoo, MI, 49008, USA. His research interests include the use of machine learning in general and deep learning in particular in support of the data-driven and self-driven management of large-scale deployments of IoT and smart city infrastructure and services, Wireless Vehicular Networks (VANETs), cooperation and spectrum access etiquette in cognitive radio networks, and management and planning of software defined networks (SDN). He is a senior member of the IEEE and an ABET Program Evaluator (PEV). He serves on editorial boards and technical program committees of multiple international journals and conferences.

The following tutorials have been cancelled:

T2: NOMA-Based Random Access for Massive MTC in 5G

Jinho Choi, Deakin University

T3: Integrated Terrestrial/Nonterrestrial 6G Networks for Ubiquitous 3D Super-Connectivity in 2030s

Halim Yanikomeroglu, Carleton University

T7: Train-to-X Communications at 5.9 GHz

Vuk Marojevic, Mississippi State University

T8: Wireless Networks Design in the Era of Deep Learning: Model-Based, AI-Based, or Both?

A. Zappone, M. Di Renzo, M. Debbah, Paris-Saclay University, CNRS-Centralesupelec-Univ. Paris-Sud

T9: Learning Perspectives for Optimization and Design of Wireless Systems

Haris Gacanin, Nokia Bell Labs

T10: Design Challenges in Tactical Mobile Networks

Pavel Loskot, Swansea University, Salman Al-Shehri, Riyadh, and Michael Hirsch, ISEA

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WORKSHOPS
SUNDAY 28 April

	Starhill 1	Starhill 2	Starhill 3	Starhill 4
7:00–17:30	Registration (Mayang Sari Foyer)			
9:00–10:30	W1: 5th International Workshop of CorNer: Communication for Networked Smart Cities	W2: 2nd International Workshop on Dependable Wireless Communications (DEWCOM)	W8: The 8th International Workshop on High Mobility Wireless Communications (HMWC) 2019	W4 INAVEC / W6 Swarm Intelligence [**starts 8:30**]
10:30-11:00	Refreshments in Exhibit Area (Mayang Sari Foyer)			
11:00–12:30	W1: 5th International Workshop of CorNer: Communication for Networked Smart Cities	W2: 2nd International Workshop on Dependable Wireless Communications (DEWCOM) [**ends 13:00**]	W8: The 8th International Workshop on High Mobility Wireless Communications (HMWC) 2019	W4 INAVEC / W6 Swarm Intelligence [**ends 13:00**]
12:30–14:00	Lunch on your own			
14:00–15:30	W5: Technology Trials and Proof-of-Concept Activities for 5G and Beyond Industry and Academic Panel 2019 (TPoC5G Panel 2019) [**starts 13:00**]	W7: Decentralized Technologies and Applications for IoT (D'IoT) Spring 2019	W8: The 8th International Workshop on High Mobility Wireless Communications (HMWC) 2019	W3: First International Workshop on Heterogenous Mobile/Multi-Access Edge Computing
15:30–16:00	Refreshments in Exhibit Area (Mayang Sari Foyer)			
16:00–17:30	W5: Technology Trials and Proof-of-Concept Activities for 5G and Beyond Industry and Academic Panel 2019 (TPoC5G Panel 2019) [**ends 18:00**]	W7: Decentralized Technologies and Applications for IoT (D'IoT) Spring 2019	W8: The 8th International Workshop on High Mobility Wireless Communications (HMWC) 2019	W3: First International Workshop on Heterogenous Mobile/Multi-Access Edge Computing
18:00–20:00	Welcome Reception (Mayang Sari Foyer, dinner on your own)			

Workshops

W1: 5th International Workshop of CorNer: Communication for Networked Smart Cities

The traffic volume will be increased due to the number of connected devices, '50 billion devices in 2020'. Also, further growth of mobile broadband is needed due to additional traffic in communicating machines '1000x in ten years'. This will present another new challenge of spectrum efficiently and energy awareness of the wireless networks. These all core main challenges collectively address by the Fifth Generation (5G) Communications tools.

Workshop Chairs
Dushantha Nalin K. Jayakody, National Research Tomsk Polytechnic University, Russia
Syed Ali Hassan, National University of Sciences and Technology (NUST), Pakistan
Rui Dinis, Universidade Nova de Lisboa, Portugal

Program

Sunday 28 April 2019 9:00-10:30 Starhill 1

Paper Session 1

Chair: Dushantha Nalin K. Jayakody, National Research Tomsk Polytechnic University

1 **An Adaptive QoS Based Video Packet Transmission Technique for IEEE802.11ac WLAN**
Jamil Khan, Summera Nosheen, The University of Newcastle Australia

2 **Coverage and Link Quality Improvement of Cellular IoT Networks with Multi-Operator and Multi-Link Strategies**
Pascal Jörke, Johannes Güldenring, Stefan Boecker, Christian Wietfeld, TU Dortmund

3 **Deep Learning based Antenna Array Fault Detection**
Kaijing Chen, University of Science and Technology of China

4 **Efficient Power Allocation for Multi-Cell Uplink NOMA Network**
Wali Ullah Khan, Shandong University; Furqan Jameel, Tapani Ristaniemi, University of Jyväskylä; Basem M. Elhalawany, Benha University; Ju Liu, Shandong University

Sunday 28 April 2019 11:00-12:30 Starhill 1

Paper Session 2

Chair: Nikhil Sharma, LNM Institute of Information Technology

1 **Performance Analysis of Massive MIMO Two-Way Relay Systems with SWIPT**
Jinlong Wang, Liming Zheng, Harbin Institute of Technology; Ming Ding, Data61, CSIRO; Gang Wang, Harbin Institute of Technology; Zihuai Lin, The University of Sydney

2 **On the Association of Small Cell Base Stations with UAVs using Unsupervised Learning**
Muhammad Karam Shehzad, Syed Ali Hassan, National University of Sciences and Technology; Aamir Mahmood, Mikael Gidlund, Mid Sweden University

3 **Performance of M-QAM Scheme over TWDP Fading for Multiple Receive Antennas System**
Akshita Gupta, Rahul Makkar, Divyang Rawal, Nikhil Sharma, LNM Institute of Information Technology, Jaipur; Dushantha Nalin K. Jayakody, National Research Tomsk Polytechnic University

4 **Rate-Energy Tradeoff for SWIPT Systems with Multi-User Interference Channels Under Non-linear Energy Harvesting Model**
Lihua Li, Rongting Cai, Hui Jiang, Xin Su, Beijing University of Posts and Telecommunications

5 **Realizing an Implementation Platform for Closed Loop Cyber-Physical Systems using Blockchain**
Abdullah Bin Masood, Hassaan Khaliq Qureshi, Syed Muhammad Danish, National University of Science and Technology (NUST); Marios Lestas, Frederick University, Cyprus

W2: 2nd International workshop on Dependable Wireless Communications (DEWCOM)

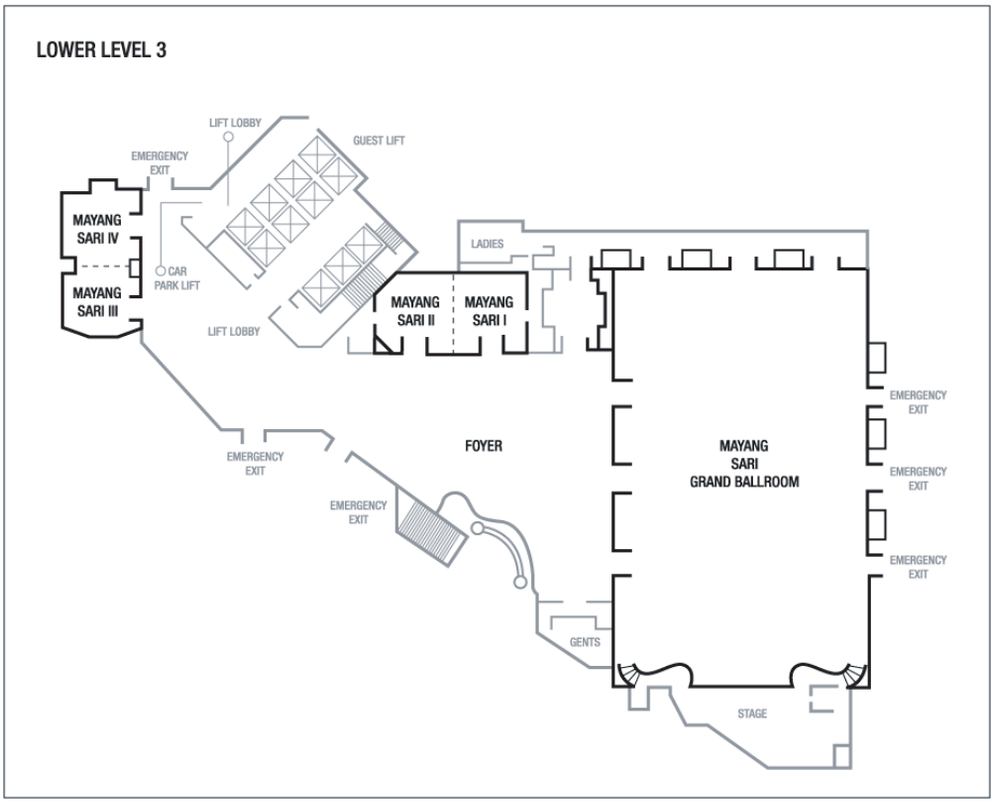
Over the past couple of decades, wireless communication technologies have become immensely adopted in various fields, appearing in a plethora of applications ranging from tracking victims, responders and equipment in disaster scenarios to machine health monitoring in networked manufacturing systems etc. Most of these applications demand strictly bounded timing response and are highly dependent on the performance of the underlying wireless communication technology. In most cases, these systems are required to have dependable timeliness requirements since data communication must be conducted within predefined temporal bounds along with fulfilling other requirements such as reliability, security etc. This is mainly because failure to address these requirements may compromise the expected behavior of the system and cause economic losses or endanger human lives. In addition, the broadcast nature of wireless communications in an open environment makes it more vulnerable to unwanted external entities compared to the wired communications. This makes the support of dependable wireless communications in open environments, where multiple devices are contending for the resources, a challenging task. Therefore, future wireless communications must tackle these challenging issues such as low communication reliability, real-time support, security, reachability and fault-tolerance based on dependability attributes.

Organisers:
Joaquim Ferreira, University of Aveiro
Muhammad Alam, Xi'an Jiaotong-Liverpool University Suzhou

Technical Program Committee:
Muhammad Alam, Department of Computer Science
João Almeida, Instituto de Telecomunicações - Aveiro
Paulo C. Bartolomeu, Instituto de Telecomunicações / University of Aveiro
Gianluca Cena, CNR-IEIIT
Emeka E. Egbogah, General Dynamics Mission Systems
Joaquim Ferreira, Instituto de Telecomunicações / ESTGA
Arunita Jaekel, University of Windsor
Igor Lopez, Construcciones y Auxiliar de Ferrocarriles
Hiraku Okada, Nagoya University
Arif Ur Rahman, Bahria University
Nadir Shah, COMSATS Institute of Information Technology, Pakistan

		Starhill 1 (A)	Starhill 2 (B)	Starhill 3 (C)	Starhill 4 (D)	Starhill 6 (E)	Starhill 7 (F)	Starhill 8 (G)	Starhill 5 (Industry Track)
SUNDAY 28 April									
7:00–17:30		Registration (Mayang Sari Foyer)							
9:00–17:30		TUTORIALS and WORKSHOPS (see separate program)							
18:00–20:00		Welcome Reception (Mayang Sari Foyer, dinner on your own)							
MONDAY 29 April									
7:00–17:30		Registration (Mayang Sari Foyer)							
9:30–9:45		Welcome Plenary (Mayang Sari Grand Ballroom)							
9:45–10:30		Keynote: **Accessing From the Sky: UAV Communications for 5G and Beyond (Rui Zhang, Dean's Chair Professor, National University of Singapore)**							
10:30–11:00		Refreshments in Exhibit Area (Mayang Sari Foyer)							
11:00–12:30	(1)	5G Networks and Systems I	Energy Efficiency	UAVs I	Resource Allocation	Cognitive Radio Networks	Detection and Channel Estimation	Driving Assistance	The Latest Updates of 5G Development in Asia-Pacific
12:30–14:00		Lunch (Mayang Sari Grand Ballroom)							
14:00–15:30	(2)	5G Networks and Systems II	Energy Harvesting	UAVs II	Scheduling Algorithms	Cellular and Cognitive Radio Networks	Cooperative Communications	Electric Vehicles	RF Sensing - 5G and Beyond
15:30–16:00		Refreshments in Exhibit Area (Mayang Sari Foyer)							
16:00–17:30	(3)	5G Networks and Systems III	Green Communications I	Satellite Networks and HAPS	Multiple Access	Channel Modeling and Measurements	MIMO	Electric Vehicles and Intelligent Transportation	5G Test Bed, Test and Measurement Issues and Challenges
18:00–19:30		**IEEE Young Professionals Industry Forum: Smart Vehicular Safety in the Era of the 4th Industrial Revolution** (Starhill 5)							
TUESDAY 30 April									
8:00–17:30		Registration (Mayang Sari Foyer)							
9:00–9:45		Keynote: **Malaysian National Automotive Policy 2019 (Dato' Madani Sahari, Malaysia Automotive Institute)**							
9:45–10:30		Keynote: **Physical-Layer Signal Processing vs. Machine Learning: Perspectives and Challenges (Haris Gacanin, Department Head, Nokia Bell Labs, Belgium)**							
10:30–11:00		Refreshments in Exhibit Area (Mayang Sari Foyer)							
11:00–12:30	(4)	Massive MIMO I	Internet of Things I	Positioning and Navigation	Antenna Systems	Green Communications II	Channel Coding	Intelligent Transportation	Data Networking in Autonomous Vehicles
12:30–14:00		VTC2019-Spring and VTS Awards Luncheon (Mayang Sari Grand Ballroom)							
14:00–15:30	(5)	Massive MIMO II	Internet of Things II	Localization Techniques	Beamforming I	Neural Networks	Modulation and Coding I	Machine Learning and Optimization	Journey of Internet of Things Benefits the Smart Application
15:30–16:00		Refreshments in Exhibit Area (Mayang Sari Foyer)							
16:00–17:30	(6)	Massive MIMO III	Internet of Things III	Vehicular and Ad-hoc Networks	Beamforming II	Edge Computing and Dense Networks	Modulation and Coding II	Visible Light Communication	
18:00–21:30		VTC2019-Spring Banquet (Mayang Sari Grand Ballroom)							
WEDNESDAY 1 May									
8:00–17:30		Registration (Mayang Sari Foyer)							
9:00–9:45		Keynote: **Artificial Intelligent Driven Solutions for Drone/UAV as a Service (Kamarul A. Muhamed, Founder & CEO, Aerodyne Group, Malaysia)**							
9:45–10:30		Keynote: **Cognitive Radio and AI: An Evolution (Petri Mähönen, Head of the Institute for Networked Systems, RWTH Aachen University, Germany)**							
10:30–11:00		Refreshments in Exhibit Area (Mayang Sari Foyer)							
11:00–12:30	(7)	NOMA I	Security I	Vehicular Communications I	Heterogeneous Networks I	Propagation and Measurement	mm-Wave Systems		How Artificial Intelligent Impacts the Vehicular Industry?
12:30–14:00		Lunch (Mayang Sari Grand Ballroom)							
14:00–15:30	(8)	NOMA II	Security II	Vehicular Communications II	Heterogeneous Networks II	Relaying and Multihop Techniques	GFDM		Smart City: From Concept to Reality
15:30–16:00		Refreshments in Exhibit Area (Mayang Sari Foyer)							
16:00–17:30	(9)	OFDM	Security III	Offloading and Opportunistic Networks	Wireless Networks	Spectrum Sensing and Sharing	D2D		

Floor Plans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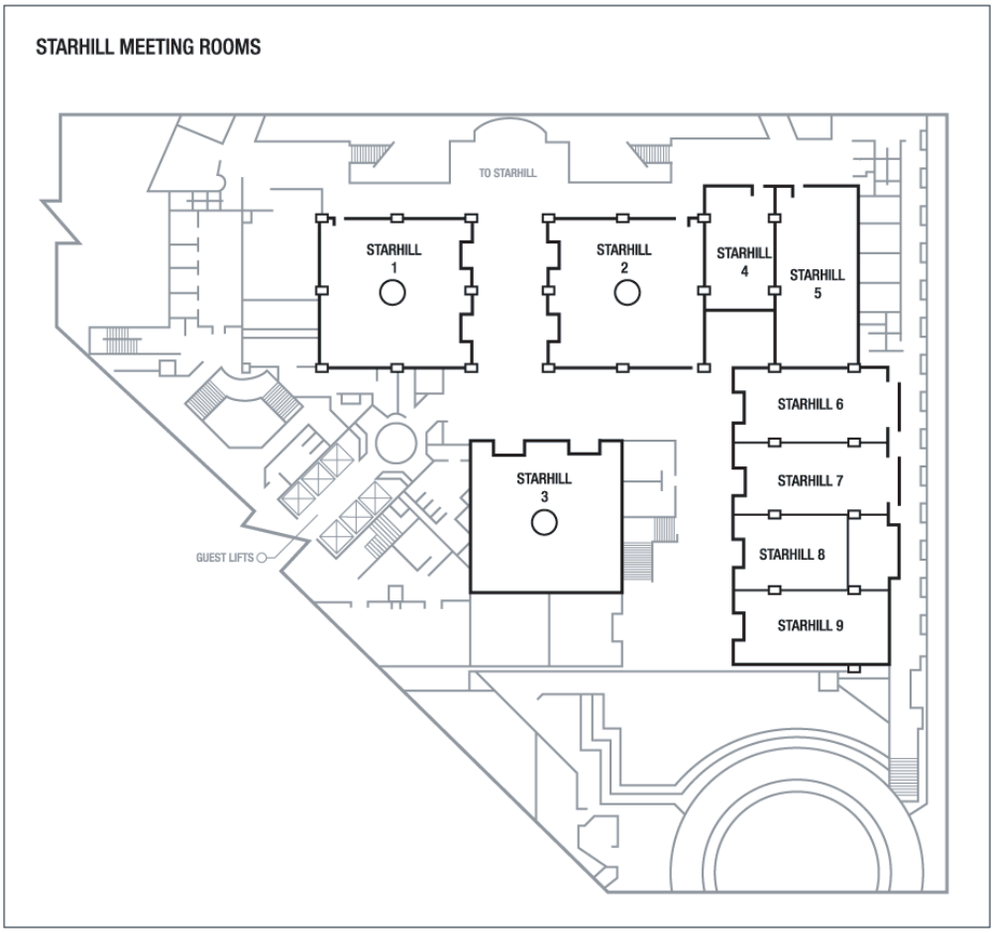
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STARHILL 9
GUEST LIFTS

W2 Program

Sunday 28 April 2019 9:00-10:00 Starhill 2

Keynote

Look Ma No Batteries! Batteryless Wireless System for Identification and Communication
Shaiful J. Hashim, Universiti Putra Malaysia (UPM)

Sunday 28 April 2019 10:00-10:30 Starhill 2

Session I

Chair: Joaquim Ferreira, University of Aveiro

1 **A QoS-Aware Multi-Tiered Body Area Network Communication Scheme for Energy Efficient Transmission**
Emeka E. Egbogah, General Dynamics Mission Systems

Sunday 28 April 2019 11:00-13:00 Starhill 2

Session II

Chair: Emeka E. Egbogah, General Dynamics Mission Systems

1 **A Semi-Supervised Learning Approach to IEEE 802.11 Network Anomaly Detection**
Jing Ran, Yidong Ji, Tang Bihua, Beijing University of Posts and Telecommunications

2 **Enabling Proof-of-Work for Low-End IoT Devices**
Paulo C. Bartolomeu, Emanuel Vieira, Instituto de Telecomunicações / University of Aveiro; Joaquim Ferreira, Instituto de Telecomunicações / ESTGA

3 **Overhead of V2X secured messages: an analysis**
João Rufino, Instituto de Telecomunicações - Aveiro; Luis Silva, Bruno Fernandes, Instituto de Telecomunicações; João Almeida, Instituto de Telecomunicações - Aveiro; Joaquim Ferreira, Instituto de Telecomunicações / ESTGA

4 **Power Control and Mode Selection Algorithm for D2D Communications**
Praveen Pawar, Aditya Trivedi, ABV-IIITM Gwalior

W3: First International Workshop on Heterogenous Mobile/Multi-Access Edge Computing (HMEC 2019)

The recent development of wireless networking and mobile cloud computing initiates an emerging cyber system called mobile edge computing, or multi-access mobile edge computing (MEC). MEC proposes moving computing and data processing capability away from distant cloud datacenters to edge servers that are located closer to the mobile devices to offer users the lowest possible latency, the highest possible bandwidth, and direct access to real-time network services.

Although MEC is expected to largely improve the QoS and QoE for mobile applications, it is challenging to realize and utilize the MEC systems effectively and efficiently due to its inherent heterogeneities. First, since a typical MEC datacenter is supposed to be composed of heterogenous resources such as CPU clusters, GPU clusters, FPGAs, programable network routers, etc., the heterogeneity makes the integration with traditional orchestration frameworks a fundamental challenge. In addition, due to the differences in scales, architectures, and Internet access technologies, it is challenging to realize the coordination of multiple MEC datacenters for conducting complicated tasks. Finally, the applications using MEC are also heterogenous. Different applications have different objectives and metrics, and correspondingly different flavors to specific MEC servers. Therefore, not only application-specific optimization, but also joint optimization of multiple applications and the MEC orchestration has to be considered. Addressing these issues efficiently will have significant importance to the future mobile computing and communications technologies.

The objective of this workshop is to identify and address the challenges and opportunities of developing and utilizing HMEC.

General Chairs:
Xun Shao, Kitami Institute of Technology, Japan
Zhi Liu, Shizuoka University, Japan
Seng W. Loke, Deakin University, Australia
TPC Chairs:
Ziji Ma, Hunan University, China
Qitao Gan, Telenor, Norway
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Yu Gu, Hefei University of Technology
Qiyue Li, Hefei University of Technology
Yangjie Cao, Zhengzhou University
Wei Cai, Chinese University of Hong Kong
Celimuge Wu, University of Electro-Communications
Fan He, Wuhan Univerisity of Technology
Eum Suyong, Osaka University
Lu Chen, Kyoto Institute of Technology
Haihua Chen, China University of Petroleum
Yi-Han Chiang, National Institute of Informatics
Wen Zheng, Waseda University
Keping Yu, Waseda University

Program

Sunday 28 April 2019 14:00-15:30 Starhill 4

Keynotes

Analyzing Effect of Edge Computing on Reduction of Web Response Time
Noriaki Kamiyama, Fukuoka University, Japan

Keynote
Ying Cui, Shanghai Jiao Tong University, China

Sunday 28 April 2019 15:50-17:30 Starhill 4

Recent Results of Heterogeneous Mobile Edge Computing

1 **Compensational Computation Offloading for Maximizing Lifetime of Edge Networks**
Wenhao Fan, Jiayi Chen, Fan Wu, Tang Bihua, Beijing University of Posts and Telecommunications

2 **Distributed Edge Caching via Reinforcement Learning in Fog Radio Access Networks**
Liuyang Lu, Yanxiang Jiang, Southeast University; Mehdi Bennis, Oulu; Zhiguo Ding, UMIST; Fu-Chun Zheng, Harbin Institute of Technology (Shengzhen) & The University of York; Xiaohu You, Southeast University

3 **Safeguarding Non-Best User Association Aided 5G K-Tier HetNets Using Physical Layer Security**
Meng Zhou, Nanjing University of Posts and Telecommunications; Mangang Xie, Sun Yat-sen University; Yao Zhang, Nanjing University of Posts and Telecommunications; Xiangdong Jia, Northwest Normal University; Longxiang Yang, Nanjing University of Posts and Telecommunications

4 **PLR model based forecast of track irregularity for tamping operations**
Xia Yang, Hunan University; Xun Shao, Kitami Institute of Technology; Ziji Ma, Hunan Uninversity; Keli PENG, Hunan University Hicam (Hunan) Engineering Technology Research Co. Ltd

5 **A Competitive Approximation Algorithm for Data Allocation Problem in Heterogenous Mobile Edge Computing**
Xun Shao, Kitami Institute of Technology; Zhi Liu, Shizuoka University; Mianxiong Dong, Muroran Institute of Technology; Hiroshi Masui, Kitami Institute of Technology; Yusheng Ji, National Institute of Informatics

W4: 1st International Workshop on Internet of Autonomous Vehicles (INAVEC)

W6: Swarm Intelligence: Autonomous and Connected Unmanned Aircraft Systems

This combined workshop addresses evolving research topics in ITS is Internet of Vehicles (IoV) which aims to form a large network of vehicles and other wireless elements and infrastructures. Autonomous vehicles are also an important aspect of ITS providing real-time sensing and detection of safety threats, optimizing route / task planning, power consumption, coordination and collaboration with other vehicles while performing smart self-diagnostics and maintenance under different operating environment. A magor research area for autonomous vehicles is drones, and the recently created VTS ad hoc committee on drones will promote research among the members of IEEE VTS community in this important discipline. The committee will be in charge for creating a roadmap for promoting research in topics including drone connectivity, navigation, command and control, autonomy, reliability, safety, security, and regulatory aspects among others.

WP4 Organisers:
Mohammad Hossein Anisi, University of Essex, UK
Faiyaz Doctor, University of Essex, UK
Syed Hassan Ahmed, Georgia Southern University, USA
WP6 Organiser:
Kamesh Namuduri, University of North Texas, USA

Papers

Sunday 28 April 2019 8:30-9:00 Starhill 4

Opening Session

Welcome
Hossein Anisi, University of Essex

Keynote

Sunday 28 April 2019 9:00-10:30 Starhill 4

Paper Session 1

Chair: Hossein Anisi, University of Essex

1 **A Novel Hybride Contents Oriented Communication (COC) Technique based on V2X Networks**
Mushtaq Ahmad, Fakhar Abbas, Southwest Jiaotong University; Qingchun Chen, Guangzhou University; Muqeet Ahmad, Southwest Jiaotong Univeristy

2 **Autonomous Driving without a Burden: View from Outside with Elevated LiDAR**
Nalin jayaweera, Nandana Rajatheva, Matti Latva-aho, University of Oulu

3 **Graph Coloring based Approach for Resource Allocation in 5G Vehicle-to-Vehicle Communication**
Xin Wang, Jian Zhang, Fujitsu R&D Center Co., Ltd.

4 **Large Data Transfers in IoVs using Direct Links**
Pranjal Shankhdhar, Arobinda Gupta, IIT Kharagpur

5 **Performance evaluation of energy autonomous sensors for air quality monitoring in Internet of Vehicles**
Shaik Shabana Anjum, Rafidah Md Noor, Ismail Ahmedy, University of Malaya; Mohammad Hossein Anisi, University of Essex; Nasrin Aghamohammadi, University of Malaya; Norazlina Binti Khamis, Universiti Malaysia Sabah; Muhammad Ahsan Qureshi, International Islamic University

Sunday 28 April 2019 11:00-13:00 Starhill 4

Paper Session 2

Chair: Kamesh Namuduri, University of North Texas

1 **Power Controlled Adaptive Range Radar for Self Driving Vehicles**
Rohit Singh, Deepak Saluja, Suman Kumar, IIT Ropar

2 **Real Time LiDAR Point Cloud Compression And Transmission For Intelligent Transportation System**
Bhaskar Anand, Vivek Barsaiyan, Mrinal Senapati, P. Rajalakshmi, Indian Institute of Technology, Hyderabad

3 **A Cooperative Scheme for Unmanned Aerial Vehicles in Malfunction Areas**
Yanshi Sun, University of Science and Technology of China; Zhiguo Ding, UMIST; Xuchu Dai, University of Science and Technology

4 **On Network Flow Maximization via Multihop Backhauling and UAVs: An Integer Programming Approach**
Abdullateef Almohamad, Mazen O. Hasna, Tamer Khattab, Qatar University; Mohamed Haouari, Old Dominion University

5 **On the Relation Between the Communications System and the Collision Probability in Massive UAV Scenarios**
Lukas Marcel Schalk, Uwe-Carsten Fiebig, German Aerospace Center (DLR)

6 **Public LTE Network Measurements with Drones in Rural Environment**
Joonas Säe, Tampere University; Richard Wirén, Juhani Kauppi, Helka-Liina Määttänen, Johan Torsner, Ericsson Finland; Mikko Valkama, Tampere University

W5: Technology Trials and Proof-of-Concept Activities for 5G and Beyond Industry and Academic Panel 2019 (TPoC5G Panel 2019)

The 5th generation (5G) cellular communication systems are going to be launched in 2019. In the 5G standard, key enabling technologies such as massive MIMO, beamforming, or a new radio access technology are specified, and the research and development of those key technologies have been carried out in many research entities. On top of that, new

technology concepts for beyond 5G (B5G) have been currently investigated. In these regards, this panel session is aiming to provide opportunities to present the latest trials for 5G and the proof-of-concept activities for B5G. Distinguished speakers from industry as well as from academy will present their latest research and development results and will prove their perspective regarding the new directions of B5G. Through the discussion at the workshop, it is also expected to promote the exchange of new ideas among researchers.

General Co-chairs:
Tomoaki Ohtsuki, Keio University
Gerhard Bauch, Hamburg University of Technology

Organizing Committee
Yukitoshi Sanada, Keio University
Satoshi Suyama, NTT DOCOMO
Toshihiko Nishimura, Hokkaido University
Shinsuke Ibi, Doshisha University
Yuyuan Chang, Tokyo Institute of Technology

Advisories
Fumiyuki Adachi, Tohoku University
Seiichi Sampei, Osaka University
Mamoru Sawahashi, Tokyo City University
Satoshi Denno, Okayama University
Eisuke Fukuda, Fujitsu Lab.
Hidekazu Murata, Kyoto University

Technical Program Committee
Eiji Okamoto, Nagoya Institute of Technology
Hiraku Okada, Nagoya University
Kazuki Maruta, Chiba University
Kazunori Hayashi, Osaka City University
Kenichi Higuchi, Tokyo University of Science
Koji Yamamoto, Kyoto University
Masakatsu Ogawa, Sophia University
Nobuhiko Miki, Kagawa University
Osamu Muta, Kyushu University
Suguru Kameda, Tohoku University

Program

Sunday 28 April 2019 13:00-15:30 Starhill 1

Session I

Chair: Yukitoshi Sanada, Keio University

Opening Address by General Co-Chair
Tomoaki Ohtsuki, Keio University

1 **Coordinate Descent Method for Signal Detection in IDMA**
Ranran He, Yue Xiao, Jiesi Kang, Shu Fang, University of Electronic Science and Technology of China

2 **Influence of Human Body on Massive MIMO Indoor Channels**
Pengfei Cui, Andrew Zhang, University of Technology Sydney; Wen-Jun Lu, Nanjing University of Posts and Telecommunications; Y. Jay Guo, University of Technology Sydney; Hong-Bo Zhu, Nanjing University of Posts and Telecommunications

3 **Optimal Cell Selection Method for 5G Heterogeneous Network**
Masaaki Yoshino, Hideki Shingu, Hiroaki Asano, Panasonic Corporation; Yoshifumi Morihiro, Yukihiko Okumura, NTT DOCOMO

4 **5G R&D Achievements for High-Data-Rate and Low-Power-Consumption Radio Access Technologies with Higher-Frequency-Band and Wider-Bandwidth Massive MIMO**
Yukihiko Okumura, Satoshi Suyama, NTT DOCOMO, INC.; Naoto Ishii, Yasushi Maruta, NEC; Akihiro Okazaki, Atsushi Okamura, Mitsubishi Electric Corporation; Jun Terada, Takeshi Onizawa, NTT Corporation

5 **5G R&D Activities for High Capacity Technologies with Ultra High-Density Multi-Bandand Multi-Access Layered Cells**
Hiroyuki Seki, Morihiko Minowa, FUJITSU LIMITED; Satoshi Suyama, Yukihiko Okumura, NTT DOCOMO, INC.

Sunday 28 April 2019 16:00-18:00 Starhill 1

Session II

Chair: Tomoaki Ohtsuki, Keio University

1 **5G Networking Forward for Enhanced Vertical Support (Invited Talk)**
Wen Xu, Huawei Technologies Duesseldorf GmbH

2 **Towards Smart and Reconfigurable Environment: Intelligent Reflecting Surface Aided Wireless Networks (Invited Talk)**
Rui Zhang, National University of Singapore

Keynote: Evolution into 5G and The Next
Fumiyuki Adachi, Tohoku University

Panel Discussion

W7: Decentralized Technologies and Applications for IoT (D'IoT) Spring 2019

The D'IoT 2019 aims to bring together practitioners and researchers with a specific focus on the emerging trends and industry needs associated with Decentralized technologies and applications for IoT. The workshop will elaborate decentralized techniques and applications for IoT, issues associated to data preparation, pattern interpretation, visualization, analytics, privacy issues, and new applications.

Workshop Organisers:
Saba Al-Rubaye, Cranfield University, UK
Qammer H. Abbasi, University of Glasgow, UK
Sandeep Pirbhulal, Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences

Sunday 28 April 2019 14:00-17:30 Starhill 2

Papers

1 **Blockchain Combined with Smart Contract to Keep Safety Energy Trading for Autonomous Vehicles**
Ning Zhao, Hao Wu, Beijing Jiaotong University

2 **Joint optimization of transmit beamforming and receiver selection for cluster-based communications**
Yating Gao, Ningbo Zhang, Guixia Kang, Beijing University of Posts and Telecommunications

3 **Performance Analysis of Complementary GFDM in IoT Communications**
Fei Li, Kan Zheng, Hang Long, Dong Guan, Beijing University of Posts And Telecommunications

4 **Performance of SCMA with GFDM and FBMC in Uplink IoT Communications**
Fei Li, Kan Zheng, Hang Long, Dong Guan, Beijing University of Posts and Telecommunications

5 **Proof-of-Benefit: a Blockchain-enabled EV Charging Scheme**
Chao Liu, Kok Keong Chai, Xiaoshuai Zhang, Yue Chen, Queen Mary University of London

6 **Rapid Node Cardinality Estimation in Heterogeneous Machine-to-Machine Networks**
Sesha Vivek Y., Goldman Sachs, Bengaluru; P. Hari Prasad, Daikin Industries Limited; Rajesh Kumar, Sachin Kadam, Gaurav S. Kasbekar, Indian Institute of Technology Bombay

7 **SWIPT in MIMO AF Relay Systems with Direct Link**
Jinlong Wang, Gang Wang, Harbin Institute of Technology; Zihuai Lin, The University of Sydney; Liming Zheng, Harbin Institute of Technology; Ming Ding, Data61, CSIRO

8 **Use of Applications in Healthcare Informatics for Research Purposes by Students: Opportunities and Challenges in Jordan**
Jihad Alzyoud, Mohammad Kharabsheh, Sukaina Alzyoud, Eman Alzbon, The Hashemite University; Kenneth W Goodman, University of Miami

W8: The 8th International Workshop on High Mobility Wireless Communications (HMWC) 2019

The vision of future mobile communication systems is to provide seamless high data rate wireless connections for anyone at anytime and anywhere, including the high mobility scenarios such as high-speed trains and highway vehicles. High mobility results in rapidly time-varying channels, which pose significant challenges in the design of practical systems, including channel modeling, fast handover, location management, synchronization, estimation and equalization, anti-Doppler spread techniques, coding and network capacity, capacity-approaching techniques, dedicated network architectures, distributed antenna techniques and etc. With the development of connected vehicles, more rigorous performance requirements (e.g., ultra-low latency and ultra-high reliability) are also required for advanced driving applications, such as platooning, full automated driving, collective perception of environment and so on, which makes the research and development of wireless systems more challenging. Accordingly, the 8th international workshop on High Mobility Wireless Communications (HMWC) aims at fostering fruitful interactions among interested communication engineers, information theorists and system designers from all over the world, building successful collaborations and bridging the gap between theory and practice.

Organisers:
Pingzhi Fan, Southwest Jiaotong University
Shanzhi Chen, China Information Communication Technologies
Hikmet Sari, Sequans Communications
Yan Shi, Beijing University of Posts and Telecommunications

Technical Program Committee:
Xiang Cheng, Peking University
Massimo Condoluci, Ericsson Research
Pingyi Fan, Tsinghua University
Zhenxiang Gao, University of Southern California
Ruisi He, Beijing Jiaotong University
Hu Bo, Beijing University of Posts and Telecommunications
Jinling Hu, China Academy of Telecommunication Technology
Shibo He, Zhejiang University
Chengchao Liang, Carleton University
Liu, Beijing University of Posts and Telecommunications
Xiao Ma, Sun Yat-sen University
Yan Shi, Beijing University of Posts and Telecommunications
Wei Wang, Zhejiang University
Bo Yang, Shanghai Jiaotong University
Zhaoyang Zhang, Zhejiang University
Zhengquan Zhang, Southwest Jiaotong University
Kan Zheng, Beijing University of Posts & Telecommunications
Long Zhao, Beijing University of Posts & Telecommunications
Zhijin Qin, Queen Mary University of London

Sunday 28 April 2019 9:00-17:30 Starhill 3

Papers

1 **A Contract-Stackelberg Offloading Incentive Mechanism for Vehicular Parked-Edge Computing Networks**
Yuwei Li, Bo Yang, Zhijie Chen, Cailian Chen, Xinping Guan, Shanghai Jiao Tong University

2 **A Deep Neural Network Method For Automatic Modulation Recognition In OFDM With Index Modulation**
Yu Zhou, Fang Liu, Yuanan Liu, Beijing University of Posts and Telecommunications

3 **A Pricing Strategy for D2D Communication from a Prospect Theory Perspective**
Yichao Chen, Zhejiang University; Fen Hou, University of Macau; Shibo He, Zhejiang University

4 **Cluster-based resource selection scheme for 5G V2X**
Jiaqi Zhao, Xinxin He, Beijing University of Posts and Telecommunications; Wang Huan, Zheng Xufei, DOCOMO Beijing Communication Laboratories, Co., Ltd.; Jie Lv, Tao Luo, Beijing University of Posts and Telecommunications; Xiaolin Hou, DOCOMO Beijing Communications Laboratories Co., Ltd

5 **Clustering based Resource Management Scheme for Latency and Sum Rate Optimization in V2X Networks**
Fakhar Abbas, Gang Liu, Zahid Khan, Southwest Jiaotong Univeristy; Kan Zheng, Beijing University of Posts and Telecommunications; Pingzhi Fan, Southwest Jiaotong Univeristy

6 **Cooperative V2X for High Definition Map Transmission Based on Vehicle Mobility**
Fangfei Wang, Dong Guan, Long Zhao, Kan Zheng, Beijing University of Posts and Telecommunications

7 **Deep MIMO Detection Scheme for High-Speed Railways with Wireless Big Data**
Zhongkang Chen, Dapeng Li, Youyun Xu, Nanjing University of Posts and Telecommunications

8 **Energy-Efficient Power Optimization and Transmission Mode Selection for Distributed Antenna System in HSR Communications**
Jinling Hu, Xiaoming Wang, Youyun Xu, Nanjing University of Posts and Telecommunications

9 **Evaluation of Age of Information for LDPC Coded Transmission over AWGN Channels**
Mangang Xie, Qianfan Wang, Jie Gong, Xiao Ma, Sun Yat-sen University

10 **Intelligent Prediction of Mobile Vehicle Trajectory Based on Space-Time Information**
Dong Guan, Hui Zhao, Long Zhao, Kan Zheng, Beijing University of Posts and Telecommunications

11 **Key Technologies of Broadband Wireless Communication for Vacuum Tube High-speed Flying Train**
Chencheng Qiu, LiuLiu, Ye Liu, Zheng Li, Jiachi Zhang, Tao Zhou, Beijing Jiaotong University

12 **Low Complexity Detection Algorithms for OTFS under Rapidly Time-varying Channel**
Lingjun Li, Southwest Jiaotong University; Yu Liang, Pingzhi Fan, Yongliang Guan, Southwest Jiaotong University,Nanyang Technological University

13 **LTE and Millimeter Waves for V2I Communications: an End-to-End Performance Comparison**
Marco Giordani, Andrea Zanella, Michele Zorzi, University of Padova

14 **Research on LTE-V2X Sidelink Multi-carrier Resource Selection Mechanism**
Jinling Hu, Chenxin Li, China Academy of Telecommunication Technology; Fang Jiayi, State Key Laboratory of Wireless Mobile Communications; Li Zhao, China Academy of Telecommunication Technology; Yan Shi, Beijing University of Posts and Telecommunications

15 **SMDP Based Cross-Area Resource Management for Vehicular Cloud Networks**
Zhuyue Yu, Jiayou Xie, Tang Yuliang, Liang Xiao, Xiamen University

16 **Transform Domain Equalization for Doubly Selective Channels**
Xiqian Luo, Zhaoyang Zhang, Zhejiang University

17 **Wireless Charging Lane Deployment in Urban Areas Considering Traffic Light and Regional Energy Supply-Demand Balance**
Tian Wang, Bo Yang, Cailian Chen, Xinping Guan, Shanghai Jiao Tong University

VTC2019-Spring Program

Monday 29 April 2019

Monday, 29 April 2019 11:00 - 12:30 Starhill 1

1A: 5G Networks and Systems I

1 **3.5 GHz Coverage Assessment with a 5G Testbed**
Adrian Schumacher, Ruben Merz, Swisscom (Switzerland) Ltd.; Andreas Burg, EPFL

2 **A Proposal for Scalable 5G New Radio Frames**
Hedaia Ghannam, Izzat Darwazeh, University College London

3 **Comparison of Explicit CSI Feedback Schemes for 5G New Radio**
Rana Ahmed Salem, Keeth Jayasinghe, Thorsten Wild, Nokia Bell Labs

4 **Inter-Cell Radio Frame Coordination Scheme Based on Sliding Codebook for 5G TDD Systems**
Ali Esswie, Nokia Bell Labs; Klaus Pedersen, Nokia

5 **On the Multiplexing of Broadband Traffic and Grant-Free Ultra-Reliable Communication in Uplink**
Renato Barbosa Abreu, Thomas Jacobsen, Gilberto Berardinelli, Aalborg University; Klaus I. Pedersen, Nokia - Bell Labs; Nurul Huda Mahmood, Aalborg University; István Z. Kovács, Nokia Bell Labs; Preben Mogensen, Aalborg University,Nokia Bell Labs

Monday, 29 April 2019 11:00 - 12:30 Starhill 2

1B: Energy Efficiency

1 **Energy Efficiency Maximization of AF Relaying SWIPT Systems with Energy Recycling**
Chuanping Li, Peiran Wu, Minghua Xia, Sun Yat-sen University

2 **Optimization of Time Splitting based SWIPT in Battery-Assisted Full Duplex Relays**
Kamal Agrawal, IIT Delhi; Shankar Prakriya, Indian Institute of Technology, Delhi

3 **Positioning of Flying Base Stations to Optimize Throughput and Energy Consumption of Mobile Devices**
Zdenek Becvar, Pavel Mach, Jan Plachy, Miguel Fontanilla Perez de Tudela, Czech Technical University in Prague

4 **An Energy Efficient Spatio-Temporal Compression Clustering Data Collection Scheme for Wireless Sensor Networks**
Lina Xiao, Song Xiao, Yimin Zhao, Xidian University

5 **Energy Efficient Base Station Transmit Power Adaptation for Green 5G Massive MIMO Systems**
Vahid Khodamoradi, Aduwati Sali, Universiti Putra Malaysia; Asem A. Salah, University of Malaya; Borhanuddin Mohammed Ali, Raja Syamsul Azmir, Universiti Putra Malaysia; Ioannis Krikidis, University of Cyprus

Monday, 29 April 2019 11:00 - 12:30 Starhill 3

1C: UAVs I

1 **Techniques for Improving the Cooperative Traffic Conflict Detection among Drones**
Lukas Marcel Schalk, German Aerospace Center (DLR)

2 **Autonomous Unmanned Aerial Vehicle for Search and Rescue using Software Defined Radio**
Seán Óg Murphy, Kenneth N. Brown, Cormac Sreenan, University College Cork

3 **Technology assessment for radio communication between UAV and Ground: qualitative study and applications**
Najett Neji, Université Paris Saclay - Evry Val d'Essonne; Tumader Mostfa, Yasmina Bestaoui Sebbane, Université Paris Saclay

4 **Full-Duplex UAV Relay Positioning for Vehicular Communications with Underlay V2V Links**
pouya pourbaba, Manosha Kapuruhamy Badalge, Samad Ali, Nandana Rajatheva, University of Oulu

5 **High-Precision UAV Localization System for Landing on a Mobile Collaborative Robot Based on an IR Marker Pattern Recognition**
Ivan Kalinov, Evgenii Safronov, Ruslan Agishev, Mikhail Kurenkov, Alexander Petrovskii, Dzmitry Tsetserukou, Skolkovo Institute of Science and Technology

Monday, 29 April 2019 11:00 - 12:30 Starhill 4

1D: Resource Allocation

1 **Performance Analysis of NOMA-Based Cooperative Relaying Systems Over Hoyt Fading Channels**
Stefan Panic, Dushantha Nalin K. Jayakody, National Research Tomsk Polytechnic University

2 **Fast Resource Allocation for Downlink NOMA Based on Revenue and Chordal Graphs**
Yu-Wen Huang, Shao-Ming Teng, Jung-Chun Kao, Yi-Chia Lo, National Tsing Hua University

3 **QoE-Oriented Admission Control and Resource Allocation for Functional Split Millimeter-Wave Fronthaul Networks**
Tun-Ping Huang, Chun-Hao Fang, Pei-Rong Li, Kai-Ten Feng, National Chiao Tung University

4 **Semi-persistent V2X Resource Allocation with Traffic Prediction in Two-tier Cellular Networks**
Ping Chu, Andrew Zhang, University of Technology Sydney; Xiaoxiang Wang, Beijing University of Posts and Telecommunications; Gengfa Fang, University of Technology Sydney; Dongyu Wang, Beijing University of Posts and Telecommunications

5 **Deep Q-Network based Adaptive Resource Allocation with User Grouping on ICIC**
Chien-Hao Lee, Kuang-Hsun Lin, Hung-Yu Wei, National Taiwan University

Monday, 29 April 2019 11:00 - 12:30 Starhill 6

1E: Cognitive Radio Networks

1 **Replica Exchange Spatial Adaptive Play for Channel Allocation in Cognitive Radio Networks**
Wangdong Deng, Shotaro Kamiya, Koji Yamamoto, Takayuki Nishio, Masahiro Morikura, Kyoto University

2 **Whitespace Prediction Using Hidden Markov Model Based Maximum Likelihood Classification**
Ahmad Saad, Henning Schepker, Fraunhofer ESK; Barbara Staehle, HTWG Konstanz; Rudi Knorr, Fraunhofer ESK

3 **On the Joint Impact of SU Mobility and PU Activity in Cognitive Vehicular Networks with Improved Energy Detection**
Om Thakkar, Dhaval K Patel, Ahmedabad University; Guan Yong Liang, Nanyang Technological University; Sumei Sun, Institute for Infocomm Research; Yoong Choon Chang, UTAR, Malaysia; Joanne Mun-Yee Lim, School of Engineering, Monash University, Malaysia

4 **Transmit Antenna Selection for Interference Aided Wireless Energy Harvesting in Cache-assisted Cognitive Relay Networks**
Ashwini Bharade, Jitendra Otwani, Intel Corporation

5 **An Empirical Analysis of the Effect of Malicious Users in Decentralised Cognitive Radio Networks**
Arun Sivakumaran, University of Pretoria; Attahiru S. Alfa, University of Manitoba; Sunil Maharaj, University of Pretoria

Monday, 29 April 2019 11:00 - 12:30 Starhill 7

1F: Detection and Channel Estimation

1 **Channel estimation strategy for LPWA transmission at low SNR: application to Turbo-FSK**
Vincent Berg, CEA; Jean-Baptiste Doré, CEA-LETI MINATEC; Valérian Mannoni, CEA

2 **Joint IWMMSE-based Channel Estimation and Finsler-Manifold-based Codebook for the Design of V2X FDD Massive MIMO Systems**
Hong-Yunn Chen, National Taiwan University; Cheng-Fu Chou, NTU; Leana Golubchik, University of Southern California

3 **Unimodular Sequence Design with Good Local Auto- and Cross-Ambiguity Function for MSPSR System**
Tianjun Liu, Pingzhi Fan, Zhengchun Zhou, Southwest Jiaotong University; Guan Yong Liang, Nanyang Technological University

4 **Low Density Signature based Packet Access with Phase Only Adaptive Precoding**
Satoshi, Denno; Ryoko Sasaki, Yafei Hou, Okayama University

5 **LMMSE-Based Sidelink Channel Estimation for LTE Communication Systems**
Yu-Ching Huang, David Lin, National Chiao Tung University

Monday, 29 April 2019 11:00 - 12:30 Starhill 8

1G: Driving Assistance

1 **Performance Evaluation of Backoff Misbehaviour in IEEE 802.11ah Using Evolutionary Game Theory**
Liew Jiun Terng, Fazirulhisyam Hashim, Aduwati Sali, M. Fadlee A. Rasid, Universiti Putra Malaysia; Kanapathippillai Cumanan, University of York

2 **Session-Enabled Joint Radio Resource Selection for Co-Operative Automated Driving**
Prajwal Makkimane Keshavamurthy, Panagiotis Spapis, Huawei Technologies Duesseldorf GmbH; Dirk Dahlhaus, University of Kassel; Chan Zhou, Huawei Technologies, German Research Center

3 **A Software Architecture for an Autonomous Racecar**
Johannes Betz, Alexander Wischnewski, Alexander Heilmeier, Felix Nobis, Tim Stahl, Leonhard Hermansdorfer, Lienkamp Markus, Technical University of Munich

4 **Vehicle-to-Vehicle Message Sender Identification for Co-operative Driver Assistance Systems**
Hiromitsu Kobayashi, Kyungtae Han, BaekGyu Kim, Toyota InfoTechnology Center

Monday, 29 April 2019 14:00 - 15:30 Starhill 1

2A: 5G Networks and Systems II

1 **An end-to-end demonstration for 5G network slicing**
Rui Ni, Huawei

2 **Achieve High Spectral Efficiency for 5G: Multi-User MIMO versus NOMA**
Yejian Chen, Bell Labs, Nokia

3 **Adaptive Network-Device Cooperative Diversity for Ultra-Reliable and Low-Latency Wireless Control**
Saeed R. Khosravirad, Nokia Bell Labs; harish, viswanathan

4 **An Experimental Study of C-RAN Fronthaul Workload Characteristics: Protocol Choice and Impact on Network Performance**
Venu Balaji Vinnakota, Naganithin Manne, Abhijit Mondal, Debarati Sen, Sandip Chakraborty, Indian Institute of Technology Kharagpur

5 **Data Analytics in the 5G Radio Access Network and its Applicability to Fixed Wireless Access**
Oriol Sallent, Jordi Pérez-Romero, Ramon Ferrus, Ramon Agusti, Universitat Politecnica de Catalunya

Monday, 29 April 2019 14:00 - 15:30 Starhill 2

2B: Energy Harvesting

1 **Performance Impact of Nonlinear Amplification in Massive MIMO mmWave Systems**
Sara Teodoro, Universidade de Aveiro; Adão Silva, DETI / Instituto de Telecomunicações / University of Aveiro; Rui Dinis, Universidade Nova de Lisboa; Atilio Gameiro, Universidade Aveiro

2 **Cooperative Relaying with Energy Harvesting: Performance Analysis Using Extreme Value Theory**
Zhiwei Liu, Peiran Wu, Sun Yat-sen University; Daniel Benevides da Costa, Federal University of Ceara (UFC); Minghua Xia, Sun Yat-sen University

3 **Performance of Incremental Relaying with an Energy-Buffer Aided Relay**
Dileep Bapatla, Shankar Prakriya, Indian Institute of Technology, Delhi

4 **Reliable Communication Performance for Energy Harvesting Wireless Sensor Networks**
Van Nhan Vo, Khonkaen University, Thailand; Hung Tran, Elisabeth Uhlemann, Malardalen University; Quach Xuan Truong, VNU University of Engineering and Technology, Vietnam; Chakchai So-In, Khon Kaen University; Ali Balador, Mälardalen University

5 **Resource Allocation Strategy Based on RF Energy Harvesting in Heterogeneous Networks**
Jincheng Gao, Yisheng Zhao, MengJia Chen, Zhonghui Chen, Fuzhou University

Monday, 29 April 2019 14:00 - 15:30 Starhill 3

2C: UAVs II

1 **Improving Drone's Command and Control Link Reliability through Dual-Network Connectivity**
Rafhael Amorim, Aalborg University; Jeroen Wigard, István Z. Kovács, Nokia Bell Labs; Troels B. Sørensen, Aalborg University; Guillermo Pocovi, Nokia Bell Labs

2 **Optimal Collision-free Navigation for Multi-Rotor UAV Swarms in Urban Areas**
Xiangpeng Wan, Hakim Ghazzai, Yehia Massoud, Stevens Institute of Technology; Hamid Menouar, Qatar Mobility Innovations Center

3 **Analysis on Time-Variant Air-to-Ground Radio Communication Channel for Rotary-Wing UAVs**
Hsin-An Hou, Industrial Technology Research Institute; Li-Chun Wang, National Chiao Tung University

4 **Exploiting Land Transport to Improve the UAV's Performances for Longer Mission Coverage in Smart Cities**
Noureddine Lasla, Hamad Bin Khalifa University; Hakim Ghazzai, Stevens Institute of Technology; Hamid Menouar, Qatar Mobility Innovations Center; Yehia Massoud, Stevens Institute of Technology

Monday, 29 April 2019 14:00 - 15:30 Starhill 4

2D: Scheduling Algorithms

1 **Efficient Low Complexity Packet Scheduling Algorithm for Mixed URLLC and eMBB Traffic in 5G**
Ali Karimidehkordi, Aalborg University; Klaus I. Pedersen, Nokia - Bell Labs; Nurul Huda Mahmood, Aalborg University; Guillermo Pocovi, Nokia Bell Labs; Preben Mogensen, Aalborg University/Nokia Bell Labs

2 **Preemption-Aware Rank Offloading Scheduling For Latency Critical Communications in 5G Networks**
Ali Esswie, Nokia Bell Labs; Klaus Pedersen, Nokia; Preben Mogensen, Nokia Bell Labs

3 **A Real-Time Transmission Scheduling Algorithm for Industrial Wireless Sensor Networks with Multiple Radio Interfaces**
Huaguang Shi, University of Chinese Academy of Sciences; Meng Zheng, Shenyang Institute of Automation - Chinese Academy of Sciences; Wei Liang, Shenyang Institute of Automation, Chinese Academy of Sciences; Jialin Zhang, University of Chinese Academy of Sciences

4 **Urgency-Aware Scheduling Algorithm for Downlink Cognitive Long Term Evolution-Advanced**
Huda Adibah Mohd Ramli, Farah Nadia Mohd Isa, Ani Liza Asnawi, Ahmad Zamani Jusoh, Amelia Wong Azman, International Islamic University Malaysia

5 **Efficient Proportional Fairness Scheduling Method Using User Distribution in MU-MIMO THP**
Yukiko Shimbo, Hirofumi Suganuma, Waseda University; Hiromichi Tomeba, Takashi Onodera, Sharp Corporation; Fumiaki Maehara, Waseda University

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2E: Cellular and Cognitive Radio Networks

1 **Inter-frequency radio signal quality prediction for handover, evaluated in 3GPP LTE**
Caroline Svahn, Oleg Sysoev, Linköping University; Mirsad Cirkic, Ericsson Research, Linköping; Fredrik Gunnarsson, Ericsson Research; Joel Berglund, Ericsson Research, Linköping, Sweden

2 **Optimization and Learning in Energy Efficient Resource Allocation for Cognitive Radio Networks**
Mduduzi Comfort Hlophe, Sunil Maharaj, University of Pretoria

3 **Performance Comparison of Channel Sensing and Geolocation Database-based Resource Allocation Techniques for Cognitive Radio Networks**
Samoda Gamage, Jamil Khan, Duy T. Ngo, University of Newcastle, Australia

4 **Repeatability for Spatiotemporal Throughput Measurements in LTE**
Vaclav Raida, Philipp Svoboda, Martin Lerch, Markus Rupp, TU Wien

5 **A Virtual Grid Sensing Strategy based on Three Regions of Cognitive Radio System**
Lijun Peng, Jing Zhang, Wei Luo, China Electronic Technology Group Corporation No.38 Research Institute

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2F: Cooperative Communications

1 **Generalized Interference Alignment for Multi-cell Cooperative Transmission over Doubly Selective Channels**
Heng Liu, Key Lab of Information Coding and Transmission; Jiayi Lu, Key Lab of Information Coding and Transmission, SWJTU; Li Hao, Southwest Jiaotong University; Zheng Ma, KTH Royal Institute of Technology

2 **On the decoding failure probability of random network coded cooperation**
Ioannis Chatzigeorgiou, Lancaster University; Gunes Kurt, Semiha Tedik Basaran, Istanbul Technical University; Amjad Saeed Khan, Loughborough University

3 **Performance of Dual-Hop DF Relay with SSK Modulation and SWIPT over Rayleigh Fading**
Hemanta Kumar Sahu, Pravas Ranjan Sahu, Indian Institute of Technology Bhubaneswar

4 **Performance Analysis and Optimization for the LDPC-coded Multi-carrier LDS System**
Han Wang, Shanghai Jiaotong University; Kexin Xiao, Bin Xia, Shanghai Jiao Tong University; Jinglun Wang, Shanghai Jiaotong University

5 **Performance of Battery-Based Surveillance Monitor with Wireless Energy Harvesting**
Amit Patel, Shankar Prakriya, Indian Institute of Technology, Delhi

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2G: Electric Vehicles

1 **Comparisons of flat and v-shape IPMSM in Electric Vehicle compressor for high efficiency**
Hojin Jeong, Koreatech; Sangshin Kwak, Chung-ang University; Namhun Kim, Erae automotive; Jeihoon Baek, University of Koreatech

2 **Improved single particle model based state of charge and capacity monitoring of lithium-ion batteries**
Xiong Rui, Linlin Li, Yu Quanqing, Beijing Institute of Technology

3 **Model-based sensor fault detection for a Lithium-ion battery in electric vehicles**
Yu Quanqing, Xiong Rui, Cheng Lin, Beijing Institute of Technology

4 **Power Factor Control Algorithm for Matrix Rectifier for Battery Charging Systems of Electric Vehicles**
Jae-chang Kim, Sangshin Kwak, Chung-ang University; Jeihoon Baek, University of Koreatech

5 **A comparative study on fractional order models for voltage simulation of lithium ion batteries**
Xiong Rui, Jinpeng Tian, Beijing Institute of Technology

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3A: 5G Networks and Systems III

1 **Dynamically Reconfigurable Slice Allocation and Admission Control within 5G Wireless Networks**
Abida Perveen, Mohammed N. Patwary, Adel Aneiba, Birmingham City University

2 **Selective Redundant MP-QUIC for 5G Mission Critical Wireless Applications**
Rasmus Suhr Mogensen, Aalborg University; Troels E. Kolding, Guillermo Pocovi, Mads Lauridsen, Nokia Bell Labs; Christian Markmøller, Tatiana Madsen, Aalborg University

3 **System Level Analysis of eMBB and Grant-Free URLLC Multiplexing in Uplink**
Renato Barbosa Abreu, Thomas Jacobsen, Aalborg University; Klaus I. Pedersen, Nokia - Bell Labs; Gilberto Berardinelli, Aalborg University; Preben Mogensen, Aalborg University/Nokia Bell Labs

4 **Joint Bandwidth Orchestration and User Association in 5G Network Slicing**
Ken Long, Meiling Qian, Kan Chen, Xiang Yu, Chongqing University of Posts and Telecommunications

5 **A Novel Algorithm For Limiting Energy Consumption in 5G Wireless Environments Using Massive MIMO Systems**
Vincenzo Inzillo, Floriano De Rango, University of Calabria; Alfonso Ariza Quintana, University of Malaga

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3B: Green Communications I

1 **Chaos-based Delay-Constrained Green Security Communications for Fog-enabled Information-Centric Multimedia Network**
Yiwen Zhou, Qili Shen, Shanghai Jiao Tong University; Mianxiong Dong, Muroran Institute of Technology; Kaoru Ota, Muroran Institute of Technology,Japan; Jun Wu, Shanghai Jiao Tong University

2 **Energy Aware Wireless System based Software Defined Radio**
Hanadi Salman, Reem Balatiah, Ahmed Masri, Yousef Dama, An Najah National University

3 **Energy-Efficient Subchannel and Power Allocation for HetNets Based on Convolutional Neural Network**
Di Xu, Xiaojing Chen, Changhao Wu, Shunqing Zhang, Shugong Xu, Shan Cao, Shanghai University

4 **Green Communication Protocol with Geolocation**
Gautam Srivastava, Brandon University; Robert Bryce, Heartland Software; Andrew Fisher, Brandon University; Jorge Crichigno, University of Southern Carolina

5 **More Capacity and Less Power: How 5G NR can Reduce Network Energy Consumption**
Richard Tano, Ericsson; Pal Frenger, Ericsson AB, Sweden

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3C: Satellite Networks and HAPS

1 **An RF/FSO Hybrid Routing for Satellite Constellation Systems**
Yuki Kanaya, Masaki Bandai, Sophia University

2 **A Study on Cell Configuration for HAPS Mobile Communications**
Yohei Shibata, Noboru Kanazawa, Kenji Hoshino, Yoshichika Ohta, Atsushi Nagate, HAPSMobile Inc.

3 **Exploring on the Critical Link Sequence of Satellite Networks**
Yuanyuan Bi, Runzi Liu, Min Sheng, Jiandong Li, Weihua Wu, Jiaxin Wu, Zhanwei Wang, Xidian University

4 **Making Trustable Satellite Experiments: an Application to a VoIP Scenario**
Antoine Auger, TeSA Laboratory; Emmanuel Lochin, ISAE-SUPAERO; Nicolas Kuhn, CNES

5 **NOMA Precoding for Cognitive Overlay Dual Satellite Systems**
Rajendra Prasad Sirigina, A.S. Madhukumar, Nanyang Technological University; Mark Bowyer, Airbus Defence and Space

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3D: Multiple Access

1 **Non-Coherent Symbol Detection with TOA Estimation for Nanocommunication Networks**
Pankaj Singh, Yeungnam University; Byung-Wook Kim, Hoseo University; Sung-Yoon Jung, Yeungnam University

2 **LpMAC: A MAC Protocol based on Valid Prediction of the Next Hop Link in Highly Dynamic Network**
Shuhua Liu, Changle Li, Pengfei Huang, Su Wang, Wanyi Gu, Xidian University

3 **Multiple Access Technique for IoT Networks Serving Prioritized Emergency Applications**
Kautsar Fadly Firdaus, Telkom University; Khoirul Anwar, Telkom University, Center for Advanced Wireless Technologies; Suryo Adhi Wibowo, Telkom University

4 **Successive Gaussian Approximation based BP Detection for New Radio Multiple Access**
I-Hsuan Liao, Jen-Ming Wu, National Tsing Hua University

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3E: Channel Modeling and Measurements

1 **3-D Ray Tracing Based GPU Accelerated Field Prediction Radio Channel Simulator**
Juha Pyhtilä, Pekka Sangi, University of Oulu; Heikki Karvonen, University of Oulu / Centre for Wireless Communications; Markku Juntti, Markus Berg, Erkki Salonen, Aarno Pärssinen, Rameez Lighari, University of Oulu

2 **Estimation of the Velocity of Multiple Moving Persons in Non-Stationary Indoor Environments from Received RF Signals**
Rym Hicheri, Matthias Pätzold, University of Agder

3 **NLOS Identification for Wideband mmWave Systems at 28 GHz**
An Huang, Lei Tian, Tao Jiang, Zhang Jianhua, Beijing University of Posts and Telecommunications

4 **A 3D Non-Stationary Cluster Channel Model for Human Activity Recognition**
Ahmed Abdelgawwad, Matthias Pätzold, University of Agder

5 **Spatial Consistency Evaluation Based on Massive SIMO Measurements**
Sida Dai, Fraunhofer Heinrich Hertz Institute; Martin Kurras, Fraunhofer Heinrich Hertz Institute (HHI)

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3F: MIMO

1 **Internal Crosstalk Calibration for a Fully-Switched MIMO Channel Sounder**
Eun Ae Lee, Junseok Kim, Pohang University of Science and Technology (POSTECH); Hyuk-Je Kim, Young-Jun Chong, Electronic Telecommunications Research Institute (ETRI); Joon Ho Cho, Pohang University of Science and Technology (POSTECH)

2 **Active Power Splitter Gain and Bandwidth Optimization for a 60GHz Hybrid MIMO System**
Steve Blandino, KU Leuven; Abhijeet Kanitkar, Technische Universit¨at Chemnitz, Chemnitz, Germany; Claude Desset, Andre Bourdoux, imec; Sofie Pollin, KU Leuven

3 **Outage Performance for Power Beacon-Assisted Wireless-Powered Cooperative Communications**
Oussama Messadi, Aduwati Sali, Universiti Putra Malaysia; Gaofeng Pan, Southwest University; Zhiguo Ding, UMIST; Nor Kamariah Noordin, S. J. Hashim, Universiti Putra Malaysia

4 **Analytical Performance of Receive Antenna Shift Keying with Maximum Ratio Transmission and Different Detection Algorithms**
Ali Mokh, Institut d'Electronique et de télécommunication de Rennes; Maryline Helard, INSA de Rennes; Matthieu Crussière, Institute of Electronics and Telecommunications of Rennes

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3G: Electric Vehicles and Intelligent Transportation

1 **Electric Vehicles Assisted Multi-Household Cooperative Demand Response Strategy**
Xing Luo, Xu Zhu, University of Liverpool; Eng Gee Lim, Xi'an Jiaotong-Liverpool University; Wolfgang Kellerer, Technical University of Munich

2 **Incremental Hopping-window Pose-graph Fusion for Real-time Vehicle Localization**
Anweshan Das, Gijs Dubbelman, Eindhoven University of Technology

3 **Real-Time Driver Assistance Systems via Dual Camera Stereo Vision**
Yong Da Sie, Yi-Cheng Tsai, Wei-Hsun Lee, Jensen Chou, Chi-Yi Chiu, National Cheng Kung University

4 **Road Load Model Analysis for Eco-Routing Navigation Systems in Electric Vehicles**
Kritanjali Das, Chaitanya Borah, Surabhi Agarwal, Pranjal Barman, Santanu Sharma, Department of ECE, Tezpur University

5 **Stabilizing Super Smart Grids Using V2G: A Probabilistic Analysis**
Muhammad Adnan, National University of Computer and Emerging Sciences (FAST); Muhammad Tariq, National University of Computer and Emerging Sciences, Pakistan

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4A: Massive MIMO I

1 **Low-Complexity Computation of Zero-Forcing Equalizers for Massive MIMO-OFDM**
Kun Chen-Hu, Ana García-Armada, Universidad Carlos III de Madrid

2 **Backhaul Antenna Allocation Scheme in Massive MIMO Cellular Networks**
Wen-Hsing Kuo, Chia-How Chen, Yuan Ze University

3 **Capacity Analysis of Asymmetric Multi-Antenna Relay Systems using Free Probability Theory**
Lucinda Hadley, Lancaster University; Zhiguo Ding, UMIST; Zhijin Qin, Queen Mary University of London

4 **Channel Estimation for Millimeter Wave Wideband Massive MIMO Systems via Tensor Decomposition**
Long Cheng, Guangrong Yue, Xinyu Xiong, Zhiqiang Wang, Shaoqian Li, University of Electronic Science and Technology of China

5 **Iterative Channel and CFO Estimation for SC-FDE and OFDM based Massive MIMO Systems**
Zahra Mokhtari, Maryam Sabbaghian, University of Tehran; Thomas Eriksson, Chalmers University of Technology

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4B: Internet of Things I

1 **Performance Analysis of Aerial Base Station Assisted Cooperative Communication Systems**
Xianling Wang, Xiamen University of Technology; Haijun Zhang, University of Science and Technology Beijing; Yue Tian, Xiamen University of Technology; Kyeong Jin Kim, Mitsubishi Electric Research Laboratories

2 **Analytical Modeling and Design of Energy Efficient Class-Selection for Long Range Wide Area Networks**
Wun-Ci Su, Tzu-I Wu, Pei-Rong Li, Kai-Ten Feng, National Chiao Tung University

3 **Crowdedness Estimation Using RSSI on Already-deployed Wireless Sensor Networks**
Naoya Matsumoto, Jiei Kawasaki, University of Osaka; Makoto Suzuki, Sonas Corporation; Shunsuke Saruwatari, Takashi Watanabe, University of Osaka

4 **Performance Evaluation and Optimization of B.A.T.M.A.N. V Routing for Aerial and Ground-based Mobile Ad-hoc Networks**
Benjamin Sliwa, Stefan Falten, Christian Wietfeld, TU Dortmund University

5 **Secure Outdoor Smart Parking using Dual Mode Bluetooth Mesh Networks**
Paul Seymer, Duminda Wijesekera, Cing-Dao Kan, George Mason University

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4C: Positioning and Navigation

1 **A Framework for Navigation with LTE Time-Correlated Pseudorange Errors in Multipath Environments**
Kimia Shamaei, Joshua Morales, University of California, Riverside; Zaher Kassas, University of California, Irvine

2 **Simultaneous Tracking of Orbcomm LEO Satellites and Inertial Navigation System Aiding using Doppler Measurements**
Joshua Morales, Joe Khalife, University of California, Riverside; Zaher Kassas, University of California, Irvine

3 **User Tracking for Access Control with Bluetooth Low Energy**
Robert Heyn, Marc Kuhn, Henry Schulten, Gregor Dumphart, Janick Zwyssig, ETH Zurich; Florian Trösch, Schindler Aufzüge AG; Armin Wittneben, ETH Zurich

4 **Carrier-Aggregated Timing Estimation for Radio Positioning**
Wen Xu, Huawei Technologies Duesseldorf GmbH; Saeed Shojaee, RWTH; Konstantinos Manolakis, Huawei Technologies

5 **Fog-enabled WLANs for Indoor Positioning**
Yanjun Guo, Liqiang Zhao, Yong Wang, Xidian University; Qi Liu, Qiu Jiahui, China Unicom Company

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4D: Antenna Systems

1 **Downlink Performance Using Vehicle Glass Mounted Antenna for 28-GHz Band in High Mobility Environment**
Minoru Inomata, Tetsuro Imai, Daisuke Kitayama, NTT DOCOMO, INC.; Toshiki Sayama, Osamu Kagaya, Shoji Hideaki, Shoichi Takeuchi, Kiyoshi Nobuoka, AGC, INC.; Shoji Itoh, Ericsson; Hideshi Murai, Ericsson Japan; Arne Simonsson, Peter Ökvist, Ericsson Research

2 **Dual-Band Inverted F-Shaped Antenna Array for Sub-6 GHz Smartphones**
Zhengjuan Tian, Rui Chen, Changle Li, Xidian University

3 **Performance Evaluation of Cruise Controls and their Impact on Passenger Comfort in Autonomous Vehicle Platoons**
Rahi Avinash Shet, Leibniz University of Hannover; Frederik Schewe, TU Braunschweig

4 **An Improved Frequency-Hopping System with No-Hit-Zone Hopping Pattern Based on Adaptive Array Receiver for Anti-Interference**
Qi Zeng, Xing Liu, Jun Zhong, Sichuan University

5 **Eigenvalue Based Mutual Coupling Reduction**
Sandip Ghosal, Indian Institute of Technology Kharagpur; Arijit, De; Ajay, Chakrabarty

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4E: Green Communications II

1 **Optimal Operating Frequency of Inductive Power Transfer through Metal Barriers**
Han Zhang, Lianghui Ding, Feng Yang, Liang Qian, Shanghai Jiao Tong University

2 **Optimal Transmission Policy for Maximizing Green Energy Utilization in Small Cell Networks**
Mohammad Tala't, Li-Hsiang Shen, National Chiao Tung University (NCTU); Chih-Min, Yu, Yango University; Kai-Ten Feng, National Chiao Tung University

3 **Efficient Cellular Base Stations sleep mode control using Image Matching**
Sepehr Ashtarinakhaei, University of New South Wales; Farzad Tofigh, Mehran Abolhasan, Justin Lipman, University of Technology Sydney; Wei Ni, CSIRO

4 **On EE-SE trade-off for Downlink Full Duplex MISO Systems with Self-Energy Recycling**
Mohd Hamza Naim Shaikh, Vivek Bohara, IIIT-Delhi; Parag Aggarwal, Anand Srivastava, IIIT DELHI

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4F: Channel Coding

1 **Mutual-Information-Based Successive Cancellation List Decoding of Polar Codes**
Shubham K Jha, Indian Institute of Science Bangalore; Kuntal Deka, Indian Institute of Technology Goa; Shilpa Rao, Indian Institute of Information Technology Guwahati

2 **Pedestrian Tracking and Stereo Matching of Tracklets for Autonomous Vehicles**
Hao Xue, Du Q. Huynh, Mark Reynolds, The University of Western Australia

3 **Robust Low Density Parity Check Decoding Over Markov Gaussian Channels**
Der-Feng Tseng, Shi-Shun Lin, National Taiwan University of Science and Technology

4 **Construction of Replacement Set in the GC-LDPC Codes Based on BIBDs**
zhouwei, Lei Cheng, Lijun Zhang, Beijing Jiaotong University

5 **Hybrid Multi-Kernel Construction of Polar Codes**
Lei Cheng, zhouwei, Lijun Zhang, Beijing Jiaotong University

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4G: Intelligent Transportation

1 **Parallel Tree Traversals for Soft-Output MIMO Detection Using Multiple Bit Flippings**
Tsung-Hsien Liu, Jia-You Wu, Yuan-Sun Chu, National Chung Cheng University

2 **Real-Time Digital Video Streaming at Low-VHF for Compact Autonomous Agents in Complex Scenes**
Jihun Choi, U.S. Army Research Laboratory; Chirag Rao, Army Research Laboratory; Fikadu Dagefu, US Army Reseach Laboratory

3 **Modeling with Thinging for Intelligent Monitoring System**
Sabah Al-Fedaghi, Yousef Atiyah, Kuwait University

4 **Stable and Safe Automated Driving using 3-D Road Geometric Features**
Chaitanya Yavvari, Duminda Wijesekera, Zoran Duric, George Mason University

5 **Traffic Analysis Based on Bluetooth Passive Scanning**
Safa Boudabous, Julian Garbiso, Bertrand Leroy, Vedecom; Stephan Clémençon, Telecom ParisTech; Houda Labiod, Télécom ParisTech

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5A: Massive MIMO II

1 **Joint Data and Pilot Power Control Algorithm for Weighted Sum SE in Uplink Single-Cell MU-Massive MIMO systems**
Da Zhang, Gang Xie, Jinchun Gao, Beijing University of Posts and Telecommunications

2 **K-Means MU-MIMO User Clustering for Optimized Precoding Performance**
Razvan-Florentin Trifan, InfoVista, Politehnica University of Bucharest; Regis Lerbour, Gregory Donnard, Yann Le Helloco, InfoVista

3 **Spectral Efficiency of Very Large Multiuser MIMO Systems for Time-Selective Fading**
Apoorva Chawla, Aditya K. Jagannatham, Indian Institute of Technology Kanpur

4 **Uplink Pilot Reuse for Multicell MU-Massive MIMO in Physical Channel Model**
Da Zhang, Gang Xie, Jinchun Gao, Beijing University of Posts and Telecommunications

5 **Impact of IQI on Sum Rate of mmWave Massive MU-MIMO Systems with Hybrid Beamforming**
Nana Zhang, Huarui Yin, Weidong Wang, University of Science and Technology of China

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5B: Internet of Things II

1 **Validation of Backscatter Link Budget Simulations with Measurements at 915 MHz and 2.4 GHz**
Muhammad Usman Sheikh, Ruifeng Duan, Riku Jäntti, Aalto University

2 **A Novel Modulation for IoT: PSK-LoRa**
Roberto Bomfin, Technische Universität Dresden; Marwa Chafii, ENSEA, ETIS, CNRS; Gerhard Fettweis, TU Dresden

3 **Data Collection Period and Sensor Selection Method for Smart Building Occupancy Prediction**
Nour Haidar, Nouredine Tamani, University of La Rochelle; Felix Nienaber, Mark Thomas Wesseling, E.ON ERC. Aachen Germany; Alain Bouju, Yacine Ghamri-Doudane, University of La Rochelle

4 **Doppler Frequency Trajectories of the Mechanical Robot Arm and Automated Guided Vehicle in Industrial Scenarios**
kun, Liu Liu, Cheng Tao, Ze Yuan, Tao Zhou, Qiu Chencheng, Beijing Jiaotong University

5 **Multi-Connectivity for Ultra-Reliable Communication in industrial scenarios**
Emil J. Khatib, Dereje Assefa Wassie, Gilberto Berardinelli, Ignacio Rodriguez, Preben Mogensen, Aalborg University

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5C: Localization Techniques

1 **Evaluating Indoor Localization Performance on an IEEE 802.11ac Explicit-feedback-based CSI Learning System**
Takeru Fukushima, Osaka University; Tomoki Murakami, Hirantha Abeysekera, NTT Corporation; Shunsuke Saruwatari, University of Osaka; Takashi Watanabe, Osaka University

2 **An Accurate Weighted Time-Reversal Approach for Passive Indoor Localization**
Lili Zheng, Binjie Hu, Jinguang Qiu, South China University of Technology

3 **Iterative Localization Method Using AoA for IoT Sensor Networks**
Shaghayegh Monfared, Anaïs Delépaut, Mathieu Van Eeckhaute, Philippe De Doncker, Francois Horlin, Université Libre de Bruxelles

4 **On the Crucial Impact of Antennas and Diversity on BLE RSSI-based Indoor Localization**
Henry Schulten, Marc Kuhn, Robert Heyn, Gregor Dumphart, ETH Zurich; Florian Trösch, Schindler Aufzüge AG; Armin Wittneben, ETH Zurich

5 **Toward Regression-based Estimation of Localization Errors in Fingerprinting-based Localization**
Filip Lemic, Internet Technology and Data Science Lab, University of Antwerp - imec; Vlado Handziski, Technische Universität Berlin; Jeroen Famaey, Internet Technology and Data Science Lab, University of Antwerp – imec

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5D: Beamforming I

1 **Efficient Analog Beamforming with Dynamic Subarrays for mmWave MU-MISO Systems**
Hongyu Li, Zihuan Wang, Ming Li, Dalian University of Technology; Wolfgang Kellerer, Technical University of Munich

2 **A Power Efficient Fully Digital Beamforming Architecture for mmWave Communications**
Oner Orhan, Intel Corporation; Hosein Nikopour, Intel Labs; Junyoung Nam, Navid Naderializadeh, Shilpa Talwar, Intel Corporation

3 **Efficient Analog Beamforming for Max-Min Fair Multicast Transmission**
Zihuan Wang, Hongyu Li, Ming Li, Dalian University of Technology; Wolfgang Kellerer, Technical University of Munich

4 **Non-uniform Beam Design for Multi-user MmWave Systems**
Fuliang Liu, Wendong Liu, Zhaocheng Wang, Tsinghua University

5 **Delay-Aware Heuristic-Based Scheduling for 5G Flexible TDD Systems with Beamforming**
Anna Lukowa, Venkatkumar Venkatasubramanian, Nokia

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5E: Neural Networks

1 **Neural Network Based Denoising in the Wireless Channel Characterization**
Zhang Jiachi, Shandong Jiaotong University; Liu Liu, Tao Zhou, Wang Kai, Beijing Jiaotong University; Piao Zheyan, Shandong Jiaotong University

2 **A Hybrid Fuzzy Logic-Neural Network Approach For Multi-path Separation Of Underwater Acoustic Signals**
Abigail Lee-Leon, Chau Yuen, Dorien Herremans, Singapore University of Technology and Design

3 **Recurrent Neural Network-based Frequency-Domain Channel Prediction for Wideband Communications**
Wei Jiang, German Research Center for Artificial Intelligence; Hans Schotten, University of Kaiserslautern

4 **Co-channel multi-signal modulation classification based on Convolution Neural Network**
Zhendong Yin, Rui Zhang, Zhilu Wu, Harbin Institute of Technology

5 **TOA Estimation Scheme Based on CNN for B-IFDM-Based Preambles**
Zhe Luo, Nokia Shanghai Bell; Tao Tao, Bell Labs, Nokia Shanghai Bell; Jianguo Liu, Nokia Shanghai Bell

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5F: Modulation and Coding I

1 **A kind of Complementary Codes with Full-Diversity Gain over Frequency Selective Fading Channels**
Sun siyue, Songling Lv, Feng Tian, Guang Liang, Shanghai Engineering Center for Micro-satellites; Kun Wang, Huawei Technologies Co., Ltd

2 **Joint Estimation of Channel and IQ Imbalance in Media-based Modulation**
Bharath Shamasundar, A. Chockalingam, Indian Institute of Science, Bangalore

3 **Multistage Clustering based Automatic Modulation Classification**
Lamia M K, National Institute of Technology Karnataka; Lakshmi Narasimhan, IIT Palakkad

4 **Codebook Based Precoding for Spatial Modulation**
Essam Sourour, Prince Sattam Bin Abdul Aziz University

5 **Combating Transmit Antenna and Channel Correlations in Spatial Modulation Using Signature Constellations**
Mustafa Furkan Özkoç, New York University; Mutlu Koca, Bogazici University; Hikmet Sari, Nanjing University of Posts and Telecommunications

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5G: Machine Learning and Optimization

1 **A machine learning approach for detecting ultrasonic echoes in noisy environments**
Mohamed Elamir Mohamed, Heinrich Gotzig, Valeo Schalter und Sensoren; Raoul Zöllner, Hochschule Heilbronn; Patrick Mäder, Technische Universität Ilmenau

2 **A New Anti-jamming Strategy Based on Deep Reinforcement Learning for MANET**
Yingying Xu, Ming Lei, Min Li, Minjian Zhao, Bing Hu, Zhejiang University

3 **A Classification Framework for Correlated Sample Space in Cognitive Radar**
Mostafizur Rahaman Laskar, Debarati Sen, Indian Institute of Technology Kharagpur

4 **Machine Learning-Driven Optimal Proactive Edge Caching in Wireless Small Cell Networks**
Pei-Ying Lin, Hsiao-Ting Chiu, Rung-Hung Gau, National Chiao Tung University

5 **Joint Vehicle Routing and Loading in Delivery Planning: A Stochastic Programming Approach**
Naphat Ngoenriang, Vidyasirimedhi Institute of Science and Technology; Suttinee Sawadsitang, Nanyang Technological University; Chokchai Leangsuksun, Vidyasirimedhi Institute of Science and Technology; Dusit Niyato, Nanyang Technological University; Puay Siew Tan, Singapore Institute of Manufacturing Technology

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6A: Massive MIMO III

1 **One Bit Hybrid Precoding For MmWave Massive MIMO Systems**
Talha Mir, Zain Siddiqi, Tsinghua University; Usama Mir, Saudi Electronic University (SEU); Richard MacKenzie, British Telecom; Mo Hao, Tsinghua SEM Advanced ICT Lab, Beijing, China.

2 **One GAMP-based Learning Scheme for the Time-varying Massive MIMO Channels**
Yindi Yang, Xidian University; Xiushe Zhang, Research Institute of Navigation Technology; Jianpeng Ma, Shun Zhang, Xidian University

3 **Performance evaluation of multi-antenna receivers for vehicular communications in live LTE networks**
Tomasz Izydorczyk, Fernando Tavares, Gilberto Berardinelli, Madalina Bucur, Preben Mogensen, Aalborg University

4 **Enhanced CSI Acquisition Scheme For NR TDD Systems with Partial Channel Reciprocity**
Huan Sun, Yan Zhao, Bell Labs, China; Tao Tao, Bell Labs, Nokia Shanghai Bell

5 **Resource Allocation and User Association in Massive MIMO Enabled Wireless Backhaul Network**
Shweta Rajoria, Aditya Trivedi, W.Wilfred Godfrey, Praveen Pawar, ABV-IIITM Gwalior

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6B: Internet of Things III

1 **Quadrupling the Data Rate for Narrowband Internet of Things Without Modulation Upgrade**
Xinyue Liu, Izzat Darwazeh, University College London

2 **Using LoRaWAN Technology to Enhance Remote Power Network Monitoring**
Ross McPherson, Craig Hay, James Irvine, University of Strathclyde

3 **Data Exchange with the MQTT Protocol: Dynamic Bridge Approach**
Alexandre Schmitt, Florent Carlier, University of Le Mans; Valérie Renault, University of Maine

4 **Energy Efficient Smart Working Environment using Internet of Things**
Vikash, Lalita Mishra, Sajan D Chouhan, Shirshu Varma, Indian Institute of Information Technology Allahabad, India

5 **Scotto: Real-time Driver Behavior Scoring Using In-Vehicle Data**
Gorkem Kar, Yeditepe University; Batuhan Asiroglu, Fatih Sinan Bir, Ottoo Corp.

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6C: Vehicular and Ad-hoc Networks

1 **Performance Enhancement of OAM-MIMO Using Successive Interference Cancellation**
Shuhei Saito, Hirofumi Suganuma, Waseda University; Kayo Ogawa, Japan Women's University; Fumiaki Maehara, Waseda University

2 **VANET Meets Deep Learning: the Effect of Packet Loss on the Object Detection Performance**
Yuhao Wang, Vlado Menkovski, Eindhoven University of Technology; Ivan Wang-Hei Ho, The Hong Kong Polytechnic University; Mykola Pechenizkiy, Eindhoven University of Technology

3 **A Connectivity Probability Based Cross-Layer Routing Handoff Mechanism in Software Defined VANETs**
Yangshui Gao, Tao Luo, Yijun Guo, Xinxin He, Beijing University of Posts and Telecommunications

4 **Crash Avoidance based Periodic Safety Message Dissemination Protocol for Vehicular Ad hoc Network**
Suzi Iryanti Fadilah, Azizul Rahman, Mohd Hadri Hilmi, Universiti Sains Malaysia

5 **DrivMan: Driving Trust Management and Data Sharing in VANETs with Blockchain and Smart Contracts**
Uzair Javaid, Muhammad Naveed Aman, Biplab Sikdar, National University of Singapore

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6D: Beamforming II

1 **Learning-based Beam Training Algorithms for IEEE 802.11ad/ay Networks**
Ting-Wei Chang, Li-Hsiang Shen, Kai-Ten Feng, National Chiao Tung University

2 **2D- AOA Estimation and Tilt Angle Adaptation for 3D Beamforming Interference Reduction in Massive MIMO**
Ehab Ali fitouri sahlli, Mahamod Ismail, Nor Fadzilah Abdullah, Rosdiadee Nordin, Universiti Kebangsaan Malaysia (UKM); Mohammed Balfaqih, South Ural State University (SUSU); M. H. Mazlan, UKM

3 **Maximizing the Sum Rate of Massive MIMO with Rectangular Planar Array and MRT Beamforming**
Irma Zakia, Institut Teknologi Bandung

4 **Multi-resolution Beamforming and User Clustering in Downlink Massive MIMO Non-orthogonal Multiple Access System**
Xinyi Zhang, Jun Wang, Jintao Wang, Jingbo Tan, Tsinghua University

5 **Performance analysis of data recovery via application layer for LPWAN**
Nurul Adilah Abdul Latiff, Idrus Salimi Ismail, Nur Aziemah Azmi Ali, Universiti Malaysia Terengganu

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6E: Edge Computing and Dense Networks

1 **On the Coordination of Base Stations in Ultra Dense Cellular Networks**
Alexios Aravanis, Olga Munoz, Antonio Pascual-Iserte, Universitat Politècnica de Catalunya; Marco Di Renzo, CNRS, Centrale Supélec, University of Paris–Sud, France

2 **RSRP-based Handover Skipping for Ultra-dense Networks**
Xiping Wu, University of Oxford; Harald Haas, University of Edinburgh

3 **Vehicle-to-Cloudlet : Game-Based Computation Demand Response for Mobile Edge Computing through Vehicles**
Xi Lin, Jianhua Li, Shanghai Jiao Tong University; Wu Yang, Harbin Engineering University; Jun Wu, Shanghai Jiao Tong University; Zhifeng Zong, Xiaodong Wang, Shanghai Flood Control Information Center

4 **Modeling and Performance Analysis of Stochastic Mobile Edge Computing Wireless Networks**
Yixiao Gu, Cheng Li, Bin Xia, Dingjie Xu, Zhiyong Chen, Shanghai Jiao Tong University

5 **Impact of Mobility on Communication Latency and Reliability in Dense HetNets**
Abdulkadir Kose, Chong Han, Chuan Heng Foh, University of Surrey; Mehrdad Dianati, University of Warwick

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6F: Modulation and Coding II

1 **Enhanced Codebook Assisted Tomlinson-Harashima Precoding with Low Feed-forward Overhead**
Yuming Yang, Kaili Zheng, University of Electronic Science and Technology of China; Yang Song, VIVO Mobile Communication; Yue Xiao, Xiaojuan Zeng, University of Electronic Science and Technology of China

2 **Load Modulated Arrays using Channel Modulation with RF Mirrors**
Sandeep Bhat, A. Chockalingam, Indian Institute of Science, Bangalore

3 **Space-Time Coded OTFS Modulation in High-Doppler Channels**
Rose Mary Augustine, G. D. Surabhi, A. Chockalingam, Indian Institute of Science, Bangalore

4 **Fountain Coding Enabled Data Dissemination for Connected and Automated Vehicles**
Mark A. Graham, Ayalvadi Ganesh, Robert Piechocki, University of Bristol

5 **Adaptive Modulation and Frame Length Method Based on Moore State Machine in LTE-R Communication System**
MengJia Chen, Yisheng Zhao, Jincheng Gao, Zhonghui Chen, Fuzhou University

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6G: Visible Light Communication

1 **Performance Analysis of Distributed Transmit Beamforming with Quantized Channel Feedback**
Chang Kyung Sung, CSIRO; Ishtiaq Ahmad, Gottfried Lechner, University of South Australia; Hajime Suzuki, CSIRO

2 **Visible Light Positioning Considering Multi-path Reflections**
Zhengpeng Li, Lei Zhao, Ming Jiang, Sun Yat-sen University

3 **Index Time Division Multiple Access (I-TDMA) for LiFi Systems**
Hanaa Abumarshoud, Harald Haas, University of Edinburgh

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7A: NOMA I

1 **Artificial Jamming Assisted Secure Transmission for MISO-NOMA Networks**
Wei Wang, Nan Zhao, Dalian University of Technology; Yunfei Chen, University of Warwick; Jie Tang, Xiu-Yin Zhang, South China University of Technology; Zhiguo Ding, Lancaster University; Norman C. Beaulieu, Beijing University of Posts and Telcommunications

2 **On Short Term Fairness and Throughput of User Clustering for Downlink Non-Orthogonal Multiple Access System**
Mohanad Mohammed Al-Wani, Aduwati Sali, Universiti Putra Malaysia; Asem A. Salah, University of Malaya; Borhanuddin Mohammed Ali, Nor Kamaria Noordin, S. J. Hashim, Universiti Putra Malaysia; Keivan Navaie, Lancaster University; Bruce Leow, University Teknologi Malaysia

3 **On the Outage Probability of Cooperative 5G NOMA at Intersections**
Baha Eddine Youcef Belmekki, ENSEEIHT; Abdelkrim Hamza, USTHB; Benoit Escrig, Universite de Toulouse

4 **On the Performance of Nth Best Relay Selection Scheme for NOMA-Based Cooperative Relaying Networks With SWIPT**
Xinxin Liu, Guangdong University of Technology; Liang Yang, Hunan University; Jianchao Chen, Guangdong University of Technology; Fu-Chun Zheng, Harbin Institute of Technology (Shengzhen) & The University of York

5 **Multi-Branch Non-Orthogonal Multiple Access Transmission Scheme For 5G**
Chunlin Yan, Yifei Yuan, ZTE Corporation

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7B: Security I

1 **Crossfire Attack Detection using Deep Learning in Software Defined ITS Networks**
Akash Raj Narayanadoss, Tram Truong-Huu, Purnima Murali Mohan, Mohan Gurusamy, National University of Singapore

2 **Experimental Evaluation of Jamming Threat in LoRaWAN**
Chin-Ya Huang, Ching-Wei, Ray-Guang Cheng, National Taiwan University of Science and Technology; Shanchieh Jay Yang, Rochester Institute of Technology; Shiann-Tsong Sheu, National Central University

3 **Optimal Relay Selection with a Full-duplex Active Eavesdropper in Cooperative Wireless Networks**
He Zhou, Dongxuan, Hua Wang, Dewei Yang, Beijing Institute of Technology

4 **Secure Communication with Wireless Powered Friendly Jammers under Multiple Eavesdroppers**
Dongxuan, He Zhou, Hua Wang, Dewei Yang, Beijing Institute of Technology

5 **User Selection and Transceiver Design for Secure Transmission in MIMO Interference Networks**
Qiuyi Cao, Nan Zhao, Dalian University of Technology; Guan Gui, Nanjing University of Posts and Telecommunications; Yang Cao, Dalian University of Technology; Shun Zhang, Xidian University; Yunfei Chen, University of Warwick; Hikmet Sari, Nanjing University of Posts and Telecommunications

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7C: Vehicular Communications I

1 **An Efficient Authentication and Secure Vehicle-to-Vehicle Communications in an IoV**
Harsha Vasudev, Debasis Das, BITS Pilani, K.K. Birla Goa Campus, Goa, India.

2 **DSRC and IEEE 802.11ac Adjacent Channel Interference Assessment for the 5.9 GHz Band**
Junsung Choi, Virginia Tech; Vuk Marojevic, Mississippi State University; Randall Nealy, Jeffrey Reed, Carl Dietrich, Virginia Tech

3 **Evaluation Platform of Platoon Control Algorithms in Complex Communication Scenarios**
Sijie Zhu, Dip Goswami, Eindhoven University of Technology; Hong Li, NXP Semiconductors

4 **Millimeter-wave V2V Communications with Cooperative Perception for Automated Driving**
Ryuichi Fukatsu, Kei Sakaguchi, Tokyo Institute of Technology

5 **Risk Controlled Beacon Transmission in V2V Communications**
Avik Dayal, Virginia Tech; Edward Colbert, US Army Research Lab; Vuk Marojevic, Mississippi State University; Jeffrey Reed, Virginia Tech

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7D: Heterogeneous Networks I

1 **Coverage Performance in Aerial-Terrestrial HetNets**
Mohammad G. Khoshkholgh, The University of British Columbia; Keivan Navaie, Lancaster University; Halim Yanikomeroglu, Carleton University; Victor C. M. Leung, The University of British Columbia; Kang G. Shin, University of Michigan

2 **Cross-Tier Interference Management Scheme for Downlink mMIMIO-NOMA HetNet**
Ahmed Nasser, Osamu Muta, Kyushu University; Maha Elsabrouty, Egypt-Japan University of science and technology

3 **Hybrid User Association with Proactive Auxiliary Intervention for Multitier Cellular Networks**
Antti Anttonen, Aarne Mämmelä, Tao Chen, VTT Technical Research Centre of Finland Ltd.

4 **Rate-Aware Instantly Decodable Network Codes for Heterogeneous Cellular Networks**
Abdurrahman Rabih, Abdulrahman Ghandour, Yousef Shnaiwer, Samir Al-Ghadhban, King Fahd University of Petroleum and minerals

5 **Seamless Mobility Management in Heterogeneous 5G Networks: A Coordination Approach among Distributed SDN Controllers**
Ali Saeed Dayem Alfoudi, Liverpool John Moores University; S H Shah Newaz, Universiti Teknologi Brunei; Rudy Ramlie, Universiti Teknologi Brunei (UTB), Gadong, Brunei Darussalam.; Gyu Myoung Lee, Thar Baker, Liverpool John Moores University

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7E: Propagation and Measurement

1 **Millimetre Wave Propagation Reverse Measurements for 5G Urban Micro Scenario**
Saurav Dahal, Euripides Andrew Stephanou, Nathaniel Talukdar, Shabbir Ahmed, Horace King, Mike Faulkner, Victoria University

2 **Highly Accurate Prediction of Radio Propagation using Model Classifier**
Keita Katagiri, Keita Onose, The University of Electro-Communications; Koya Sato, Tokyo University of Science; Kei Inage, Tokyo Metropolitan College of Industrial Technology; Takeo Fujii, The University of Electro-Communications

3 **Experimental Evaluation of the Long-Range MIMO Outdoor Channel at 2.4 GHz**
Felix Wunsch, Douglas Weber, Holger Jäkel, Friedrich K. Jondral, Karlsruhe Institute of Technology

4 **Identifying Multipath Propagation in Vehicular Repeater Deployments by LTE Measurements**
Martin Lerch, Philipp Svoboda, Orlando Trindade, TU Wien; Josef Resch, OBB Technische Services GmbH; Vaclav Raida, Markus Rupp, TU Wien

5 **Measurement Based Modelling of In-Train Repeater Deployments**
Martin Lerch, Philipp Svoboda, Daniel Maierhofer, TU Wien; Josef Resch, Alexander Brantner, OBB Technische Services GmbH; Vaclav Raida, Markus Rupp, TU Wien

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7F: mm-Wave Systems

1 **Random Access Preamble for High Doppler in Millimeter-Wave Cellular Systems**
Mohammed Saquib Khan, Yong Soo Cho, Chung-Ang University

2 **Field trial on Millimeter Wave Intergrated Access and Backhaul**
Tingjian Tian, Yunfu Dou, renguangmei, Liang Gu, Jingtao Chen, Huawei Technologies Co., LTD; Yang Cui, Terufumi Takada, Huawei Technologies Japan K.K.; Masashi Iwabuchi, NTT DOCOMO, INC.; Jun Tsuboi, DOCOMO R&D Center; Yoshihisa Kishiyama, NTT DOCOMO, INC.

3 **Transfer Learning-Based Received Power Prediction Using RGB-D camera in mmWave Networks**
Tomoya Mikuma, Takayuki Nishio, Masahiro Morikura, Koji Yamamoto, Kyoto University; Yusuke Asai, Ryo Miyatake, NTT Network Innovation Laboratories

4 **Efficient Millimeter-Wave Infrastructure Placement for City-Scale ITS**
Ioannis Mavromatis, Andrea Tassi, Robert Piechocki, Andrew Nix, University of Bristol

5 **OTFS Modulation with Phase Noise in mmWave Communications**
G. D. Surabhi, M. Kollengode Ramachandran, A. Chockalingam, Indian Institute of Science, Bangalore

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8A: NOMA II

1 **Selective Transmission Strategy for NOMA in Downlink CoMP**
Char-Dir Chung, Chia-An Ku, National Taiwan University

2 **Compressive Sensing Algorithms for Multiuser Detection in Uplink Grant Free NOMA Systems**
Olutayo O. Oyerinde, University of the Witwatersrand

3 **Generalized Single-RF Downlink NOMA-SM System**
Mohammed Al-Ansi, Syed Alwee Aljunid, University Malaysia Perlis (UniMAP); Essam Sourour, Prince Sattam Bin Abdul Aziz University; M. S. Anuar, C. B. M Rashidi, University Malaysia Perlis (UniMAP)

4 **Performance Analysis of MIMO Visible Light based V2V Communications**
Wei Liu, Xinxin He, Beijing University of Posts and Telecommunications

5 **Stochastic Geometric Performance Analysis for Cooperative NOMA Systems**
Szu-Liang Wang, Quanzhou Institute of Equipment Manufacturing, Haixi Institutes; Tsan-Ming Wu, Chung Yuan Christian University

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8B: Security II

1 **A Preliminary Security Assessment of 5G V2X**
Aljoscha Lautenbach, Nasser Nowdehi, Tomas Olovsson, Chalmers University of Technology; Romi Zaragatzky, Volvo Group

2 **Evaluation of Security Access Service in Automotive Diagnostic Communication**
Ryo Kurachi, Nagoya University

3 **HAP-Aided Relaying Satellite FSO/QKD Systems for Secure Vehicular Networks**
Minh Q. Vu, University of Aizu, Japan; Dang The Ngoc, Posts & Telecommunications Institute of Technology; Anh T. Pham, University of Aizu

4 **Multi-level Location Privacy Protection Based on Differential Privacy Strategy in VANETs**
Qingyuan Li, Hao Wu, Xiang Wu, Lan Dong, Beijing Jiaotong University

5 **Polar Coding for Physical-layer Security without Knowledge of the Eavesdropper's Channel**
Thyago Monteiro, Marco Gomes, João Vilela, University of Coimbra; Willie K. Harrison, Brigham Young University

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8C: Vehicular Communications II

1 **Software-Defined Networks Supporting Time-Sensitive In-Vehicular Communication**
Timo Häckel, Philipp Meyer, Franz Korf, Thomas Schmidt, Hamburg University of Applied Sciences

2 **A Comparison of the V2X Communication Systems: ITS-G5 and C-V2X**
Valérian Mannoni, Vincent Berg, CEA; Stefania Sesia, Eric Perraud, Renault Software Labs

3 **Implementation and Test of DSRC standard on a Wireless-Communication-Based Active Safety System**
Tina Mirfakhraie, Ramiro Liscano, Yuping He, University of Ontario Institute of Technology

4 **Analysis of SafeCOP Features in V2I and V2V Communication**
Naeem Tahir, Kari Mäenpää, Timo Sukuvaara, Finnish Meteorological Institute

5 **Markov Chain for Modeling 3D Blockage in mmWave V2I Communications**
Fahd Alsaleem, John Thompson, David Laurenson, University of Edinburgh

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8D: Heterogeneous Networks II

1 **Energy-Efficient Joint Resource Allocation and User Association for Heterogeneous Wireless Networks with Multi-Homed User Equipments**
Guanhua Chai, Weihua Wu, Qinghai Yang, Xidian University; Kyung Sup Kwak, Inha University

2 **Mobility Context Awareness in Heterogeneous Networks to Enhance Multipath Communications**
Nandish P. Kuruvatti, Hans Schotten, University of Kaiserslautern

3 **Random Caching Based Cooperative Transmission in HetNets in the Presence of Popularity Prediction Errors**
Li Hu, Harbin Institute of Technology (Shenzhen); Fu-Chun Zheng, Harbin Institute of Technology (Shengzhen) & The University of York; Jingjing Luo, Harbin Institute of Technology (Shenzhen); Liang Yang, Hunan University

4 **System-Level Simulation for Homogeneous and Heterogeneous Cellular Networks**
Nakrop Jinaporn, Simon Armour, Angela Doufexi, University of Bristol

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8E: Relaying and Multihop Techniques

1 **Design and Experimental Prototyping of Layered Hybrid Decode-Estimate-Forward Relaying**
Abeer Ahmed, Imdad Khan, Ahmad Nayyar Hassan, Jawwad Chattha, Momin Ayub Uppal, Lahore University of Management Sciences

2 **Joint Subcarrier Pairing and Power Allocation for Achieving Energy-Efficient Decode-and-Forward Relay Networks**
Keshav Singh, Meng-Lin Ku, National Central University; Chih-Min, Yu, Yango University

3 **On the Performance of DF Based Dual-Hop Mixed RF/UWOC System**
Sanya Anees, Rima Deka, Indian Institute of Information Technology Guwahati

4 **Throughput Analysis for IEEE 802.11 Multi-hop Networks Considering Transmission Rate**
Takeshi Kanematsu, Kien Nguyen, Hiroo Sekiya, Chiba University

5 **In-Band Pilot Overhead in Ultra-Reliable Low Latency Decode and Forward Relaying**
Parisa Nouri, Hirley Alves, University of Oulu; Richard Demo Souza, UFSC; Matti Latva-aho, University of Oulu

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8F: GFDM

1 **Precoded-OFDM within GFDM Framework**
Ahmad Nimr, Technische Universität Dresden, Germany; Marwa Chafii, ENSEA, ETIS, CNRS; Gerhard Fettweis, TU Dresden

2 **A New GFDM Receiver with Tabu Search**
Jinkyo Jeong, Insik Jung, Jintae Kim, Daesik Hong, Yonsei University

3 **Binomial Frequency Division Multiplexing:Novel Waveform with Spectral Efficiency and Robustness to Multipath Fading**
Do Young Kwak, Myungsup Kim, KAIST

4 **Impact of CFO on Low Latency-Enabled UAV using "Better than Nyquist" Pulse Shaping in GFDM**
Navuday Sharma, Politecnico di Milano; Atul Kumar, Technische Universität Dresden; Maurizio Magarini, Stefano Bregni, Politecnico di Milano; Dushantha Nalin K. Jayakody, National Research Tomsk Polytechnic University

5 **Performance Comparison of Small Cell and Distributed Antenna Systems for In-Building Mobile Communications**
Temitope Alade, University of Worcester; Qasim Ahmed, University of Huddersfield

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9A: OFDM

1 **Belief Propagation Receivers for Near-Optimal Detection of Nonlinearly Distorted OFDM Signals**
Sergey Zhidkov, Cifrasoft Ltd.; Rui Dinis, Universidade Nova de Lisboa

2 **Rectangular Differential OFDM with index modulation**
Lixia Xiao, Pei Xiao, University of Surrey; Yue Xiao, Chaowu Wu, University of Electronic Science and Technology of China; De Mi, Ibrahim Hemadeh, University of Surrey

3 **Reducing the PAPR of GFDM Systems with Quadratic Programming Filter Design**
Zee Ang Sim, Regina Reine Hendranata, Zhuquan Zang, Filbert Juwono, Lenin Gopal, Curtin University

4 **Reweighted ?1-VFF Modified RLS-based Channel Estimator for OFDM-IDMA Systems**
Olutayo O. Oyerinde, University of the Witwatersrand

5 **Non-Cooperative Interference Avoidance in Automotive OFDM Radars**
Yu-Chien Lin, Wei-Ho Chung, Ta-Sung Lee, Yun-Han Pan, National Chiao Tung University

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9B: Security III

1 **Shared Secret Key Generation via Carrier Frequency Offsets**
Waqas Aman, Aneeqa Ijaz, Muhammad Mahboob Ur Rahman, Information Technology University, Lahore; Dushantha Nalin K. Jayakody, National Research Tomsk Polytechnic University; Haris Pervaiz, Lancaster University

2 **Towards a Security Architecture for Protecting Connected Vehicles from Malware**
Shahrear Iqbal, SecurityCompass; Anwar Haque, University of Western Ontario; Mohammad Zulkernine, Queen's University

3 **An Adaptive Information Reconciliation Protocol for Physical-layer Based Secret Key Generation**
Zheying Zhang, Guyue Li, Aiqun Hu, Southeast University

4 **Light-weight Security for Advanced Metering Infrastructure**
Mohsin Kamal, National University of Computer and Emerging Sciences, Peshawar

5 **Secrecy Rate Optimization of Cellular Networks with Jamming Based on Imperfect Wiretap CSI**
Ming Zhang, Yong Shang, Shiwei Yan, Yanbo Huang, Peking University

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9C: Offloading and Opportunistic Networks

1 **Characterizing and Estimating Bulk Transfer Size in Mobile Opportunistic Network**
Gourish Goudar, Suvadip Batabyal, BITS PILANI HYDERABAD CAMPUS

2 **Agile Data Offloading over Novel Fog Computing Infrastructure for CAVs**
Andrea Tassi, Ioannis Mavromatis, Robert Piechocki, Andrew Nix, University of Bristol; Christian Compton, Tracey Poole, Wolfgang Schuster, Atkins Global Limited

3 **A Big Sensor Data Offloading Scheme in Rail Networks**
Mahdi Saki, Mehran Abolhasan, Justin Lipman, University of Technology Sydney

4 **Secure Data Offloading Strategy for Connected and Autonomous Vehicles**
Andrea Tassi, Ioannis Mavromatis, Robert Piechocki, Andrew Nix, University of Bristol

5 **A Social-aware Opportunistic Network Routing Protocol Based on the Node Embeddings**
Gang Xie, Nanxu Chen, Beijing University of Posts and Telecommunications

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9D: Wireless Networks

1 **Spectrum Efficient Support of IEEE 802.11ba in an IEEE 802.11ax Network**
Leif Wilhelmsson, Miguel M. López, Ericsson AB

2 **Adaptive Negotiation for Block Acknowledgment Session Management**
Kaoutar Abdelalim, Orange/IMT Atlantique; Getachew Redieteab, Sandrine Destouet Roblot, Orange; Karine Amis, CNRS, UMR 6285 Lab-STICC, IMT Atlantique

3 **Analysis of Non-Pilot Interference on Link Adaptation and Latency in Cellular Networks**
Raghunandan M Rao, Virginia Tech; Vuk Marojevic, Mississippi State University; Jeffrey Reed, Virginia Tech

4 **Gaussian Process Regression for Feedback Reduction in Wireless Multiuser Networks**
Samira Homayouni, Stefan Schwarz, Markus Rupp, Technische Universität Wien

5 **Experimental Validation of the Performance of Channel Prediction Algorithms in MU-MIMO-OFDM Downlink System**
Maneesha Sharma, Dhammika Jayalath, Queensland University of Technology; Hajime Suzuki, Chang Kyung Sung, CSIRO

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9E: Spectrum Sensing and Sharing

1 **A PBNS Based Detection Algorithm for Cooperative Wideband Spectrum Sensing Using Hard Combining**
Kamal Captain, Dhirubhai Ambani institute of information and communication technology

2 **Maximum Achievable Sum Rate in Highly Dynamic Licensed Shared Access**
Samuel Olusayo Onidare, Keivan Navaie, Qiang Ni, Lancaster University

3 **New Spectrum Bands for HAPS: Sharing with Fixed-Satellite Systems**
Calil Bento Queiroz, University of Brasília (UnB); Robson. D. Vieira, Ektrum; Andre Noll Barreto, Barkhausen Institut; Azar Zarrebini, Access Partnership; Edgar Souza, Agostinho Linhares, Anatel

4 **The Optimal Spectrum Sensing Stopping Rules Considering Power Limitation in Cognitive Radio**
Kangjing Peng, Gang Xie, Beijing University of Posts and Telecommunications

5 **On Throughput Maximization of Cooperative Spectrum Sensing using the m-out-of-K Rule**
Narasimha Rao Banavathu, Mohammed Zafar Ali Khan, Indian Indian Institute of Technology Hyderabad

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9F: D2D

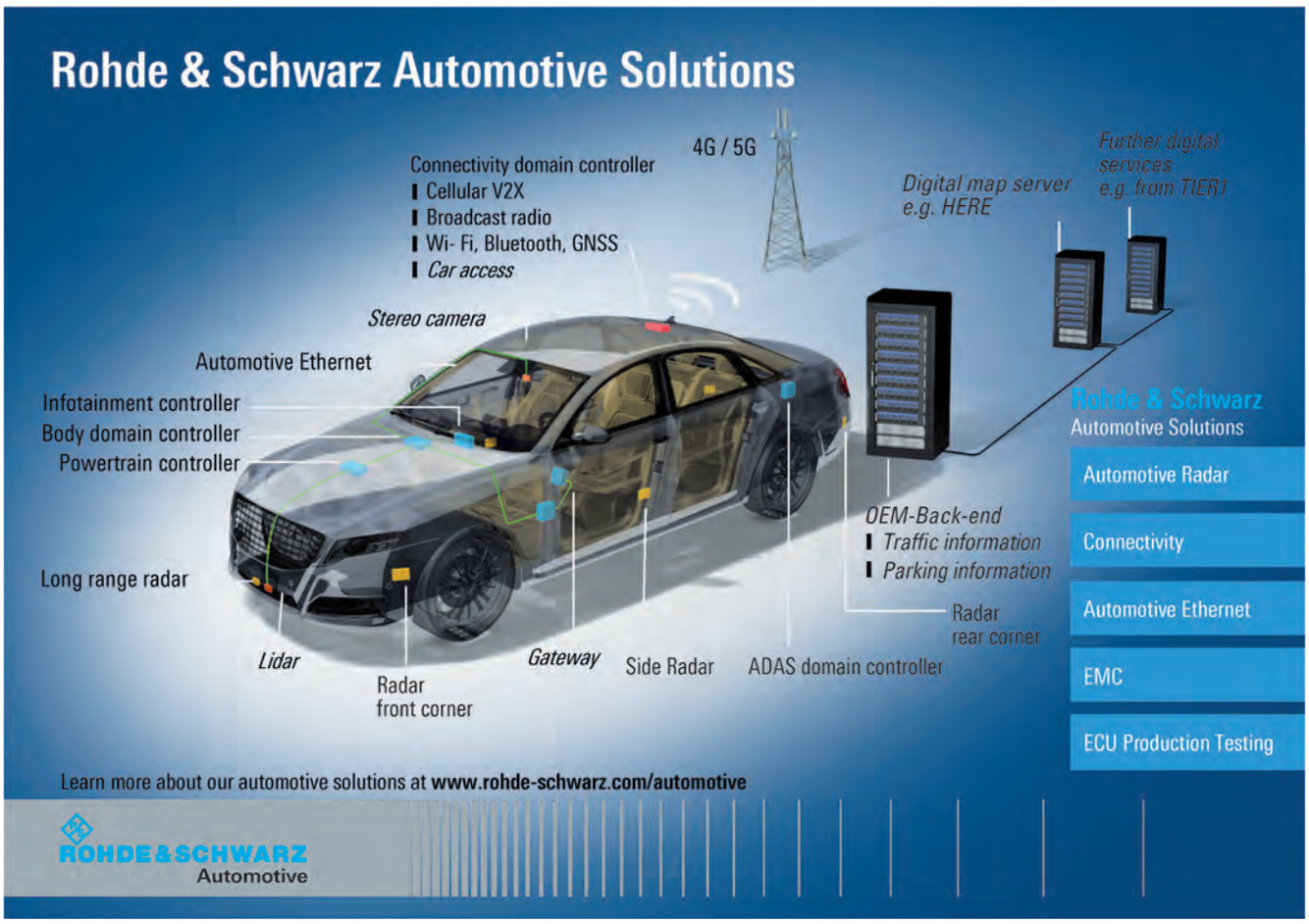
1 **Cooperative NOMA with AF Relaying over Nakagami-m Fading in a D2D Network**
Sandeep Joshi, Ranjan Mallik, Indian Institute of Technology Delhi

2 **Coalitional Game Framework for Content Distribution Using Device-to-device Communication**
Aditya MVS, Indian Institute of Technology Bombay; Chitrarth Shrivastava, Goldman Sachs; Gaurav S. Kasbekar, Indian Institute of Technology Bombay

3 **Resource Spreading for Improved Spectral and Energy Efficiency of mmWave D2D-Enabled Cellular Networks**
Anup Chaudhari, Siva Ram Murthy Chebiyyam, Indian Institute of Technology Madras

4 **BS-assisted Task Offloading for D2D Networks with Presence of User Mobility**
Ghafour Ahani, Uppsala University

5 **A D2D Multicast Network Architecture for Vehicular Communications**
Shashank Kumar Gupta, Jamil Khan, Duy T. Ngo, University of Newcastle Australia



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