IEEE/CIC INTERNATIONAL CONFERENCE ON COMMUNICATIONS IN CHINA

IEEE/CIC ICCC 2020

9-11 AUGUST 2020, CHONGQING, CHINA

FINAL PROGRAM

Virtual Address：https://ieee-iccc.info/day/1

IEEE

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中国通信学会
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Time/Day	Sunday, 9 August 2020							
	Tutorial				Workshop			
	Virtual Room 1	Virtual Room 2	Virtual Room 3	Virtual Room 4	Virtual Room 5	Virtual Room 6	Virtual Room 7	Virtual Room 8
09:00-10:30	TUT-01: Age of Information as a New Data Freshness Metric in the IoT Era: From Theory to Implementation	TUT-02: Privacy and Security in Federated Learning	TUT-03: Wireless Communications with Intelligent Reflecting Surface	TUT-04: Sparsity Modulation for mmWave, Terahertz and Optical Wireless Communication	WS1-1: Terahertz Band Communication Networks, and 5G and 6G Channel Models	WS3-1: Network Softwarization for Internet of Things	WS4-1: 2nd EBTSRA 2020: Second International Workshop on Emerging Blockchain Technology Solutions for Real-world Applications (EBTSRA)	WS5-1: 2nd Workshop on 5G Meets AI/ML: Data-driven connectivity, computing and control
10:30-11:00	Virtual Coffee Break							
11:00-12:30	TUT-01: Age of Information as a New Data Freshness Metric in the IoT Era: From Theory to Implementation	TUT-02: Privacy and Security in Federated Learning	TUT-03: Wireless Communications with Intelligent Reflecting Surface	TUT-04: Sparsity Modulation for mmWave, Terahertz and Optical Wireless Communication	WS1-2: Terahertz Band Communication Networks, and 5G and 6G Channel Models	WS3-2: Network Softwarization for Internet of Things	WS4-2: 2nd EBTSRA 2020: Second International Workshop on Emerging Blockchain Technology Solutions for Real-world Applications (EBTSRA)	WS5-2: 2nd Workshop on 5G Meets AI/ML: Data-driven connectivity, computing and control
12:30-14:00	Lunch Time							
14:00-15:30	TUT-05: Information freshness for IoT networks: from concept to application	TUT-06: Cell-Free Massive MIMO Systems: A New Next-Generation Paradigm	TUT-07: Reconfigurable Intelligent Surface for 6G: Communication, Sensing, and Localization		WS2-1: 5G and Beyond Technology-enabled e-Health (5GB e-Health)	WS3-3: Network Softwarization for Internet of Things	WS4-3: 2nd EBTSRA 2020: Second International Workshop on Emerging Blockchain Technology Solutions for Real-world Applications (EBTSRA)	WS6-1: Workshop on Optical Wireless Communication (OWC)
15:30-16:00	Virtual Coffee Break							
16:00-17:30	TUT-05: Information freshness for IoT networks: from concept to application	TUT-06: Cell-Free Massive MIMO Systems: A New Next-Generation Paradigm	TUT-07: Reconfigurable Intelligent Surface for 6G: Communication, Sensing, and Localization		WS2-2: 5G and Beyond Technology-enabled e-Health (5GB e-Health)	WS3-4: Network Softwarization for Internet of Things		WS6-2: Workshop on Optical Wireless Communication (OWC)

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Time/Day	Monday, 10 August 2020	Tuesday, 11 August 2020
08:30-09:00	**Opening Ceremony** — Yanchuan Zhang (Secretary General, CIC); Xinbo Gao (President, CQUPT); Vincent Chan (President, IEEE ComSoc); Nei Kato (General Chair lead); Sherman Shen (Awarder)	
09:00-09:45	**Keynote 1: Empowering 5G Cellular Connectivity Through Intelligent Edge Computing and Aerial Support** — Abbas Jamalipour (Professor, IEEE Fellow, F-IEAust, Univesity of Sydney, Australia)	**Keynote 4: Mobile Edge Joint Exploration of Big IoT Data for Smart City Applications** — Jeng-Neng Hwang (Professor, IEEE Fellow, University of Washington, US)
09:45-10:30	**Keynote 2: Match-Making for Massive MIMO and Deep Learning** — Zhi Ding (Professor, IEEE Fellow, University of California at Davis, US)	**Keynote 5: 5G Evolution and Beyond** — Zhenfei Tang (Senior Manager, 5G evolution research, Huawei Technologies Co., Ltd, China)

Monday 10:30-11:15: Keynote 3: From Shannon Theory to Future 6G's Technique Potentials — Xiaohu You (Professor, IEEE Fellow, Southeast University, China)

Tuesday 10:30-11:15:

Virtual Room 1	Virtual Room 2	Virtual Room 3	Virtual Room 4	Virtual Room 5	Virtual Room 6	Virtual Room 7	Virtual Room 8
CT-02	WCS-07	WCS-10	MWN-04	MWN-07	SPC-04	IoT-04	NGNI-04

11:15-12:00: Lunch Time (Monday) / Lunch Time (Tuesday)

12:00-13:30 / 13:30-15:00 — Monday:

Virtual Room 1	Virtual Room 2	Virtual Room 3	Virtual Room 4	Virtual Room 5	Virtual Room 6	Virtual Room 7	Virtual Room 8	Virtual Room 9
IT-01	WCS-01	WCS-04	MWN-01	SPC-01	NGNI-01	IoT-01	CIS-01	SAC-01

12:00-13:30 / 13:30-15:00 — Tuesday:

Virtual Room 1	Virtual Room 2	Virtual Room 3	Virtual Room 4	Virtual Room 5	Virtual Room 6	Virtual Room 7	Virtual Room 8
CT-03	WCS-08	WCS-11	MWN-05	MWN-08	SPC-05	IoT-05	NGNI-05

15:00-15:10: Virtual Coffee Break (both)

15:10-16:40 — Monday:

Virtual Room 1	Virtual Room 2	Virtual Room 3	Virtual Room 4	Virtual Room 5	Virtual Room 6	Virtual Room 7	Virtual Room 8	Virtual Room 9
IT-02	WCS-02	WCS-05	MWN-02	SPC-02	NGNI-02	IoT-02	CIS-02	SAC-02

15:10-16:40 — Tuesday:

Virtual Room 1	Virtual Room 2	Virtual Room 3	Virtual Room 4	Virtual Room 5	Virtual Room 6	Virtual Room 7	Virtual Room 8
CT-04	WCS-09	WCS-12	MWN-06	CIS-04	CIS-05	IoT-06	

16:40-16:50: Virtual Coffee Break (both)

16:50-18:20 — Monday:

Virtual Room 1	Virtual Room 2	Virtual Room 3	Virtual Room 4	Virtual Room 5	Virtual Room 6	Virtual Room 7	Virtual Room 8	Virtual Room 9
CT-01	WCS-03	WCS-06	MWN-03	SPC-03	NGNI-03	IoT-03	CIS-03	SAC-03

16:50-18:20 — Tuesday: Closing Ceremony

The program may re-schedule subject to the situation change. To find the final version please check the website: http://iccc2020.ieee-iccc.org

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TUTORIALS

Tutorial 1: Age of Information as a New Data Freshness Metric in the IoT Era: From Theory to Implementation
Instructor: Nikolaos Pappas, He CHEN

Tutorial 2: Privacy and Security in Federated Learning
Instructor: Shi Jin, Jun Li, Chuan Ma

Tutorial 3: Wireless Communications with Intelligent Reflecting Surface
Instructor: Caijun Zhong

Tutorial 4: Sparsity Modulation for mmWave, Terahertz and Optical Wireless Communication
Instructor: Shuaishuai Guo, Haixia Zhang, Shuping Dang, Mohamed-Slim Alouini

Tutorial 5: Information freshness for IoT networks: from concept to application
Instructor: Tony Quek, Howard H. Yang, Xijun Wang, Chao Xu

Tutorial 6: Cell-Free Massive MIMO Systems: A New Next-Generation Paradigm
Instructor: Jiayi Zhang

Tutorial 7: Reconfigurable Intelligent Surface for 6G: Communication, Sensing, and Localization
Instructor: Boya Di, Hongliang Zhang, Lingyang Song, Zhu Han

WORKSHOPS

1: Terahertz Band Communication Networks, and 5G and 6G Channel Models

2: 5G and Beyond Technology-enabled e-Health (5GB e-Health)

3: Network Softwarization for Internet of Things

4: 2nd EBTSRA 2020: Second International Workshop on Emerging Blockchain Technology Solutions for Real-world Applications (EBTSRA)

5: 2nd Workshop on 5G Meets AI/ML: Data-driven connectivity, computing and control

6: Workshop on Optical Wireless Communication (OWC)

TECHNICAL SESSIONS

IT: Invited Track

CT: Communications Theory

WCS: Wireless Communications Systems

MWN: Mobile and Wireless Networks

SPC: Signal Processing for Communications

NGNI: Next Generation Networking and Internet

IOT: Internet of Things

CIS: Communication and Information Security

SAC: Selected Areas in Communications

Locations of Meeting Rooms
 - **TUTORIALS:**
       Virtual Room 1, 2, 3, 4.
 - **WORKSHOPS:**
       Virtual Room 5, 6, 7, 8.
 - **Technical Sessions:**
       Virtual Room 1, 2, 3, 4, 5, 6, 7, 8, 9.

IEEE/CIC ICCC 2020

WELCOME MESSAGE FROM THE GENERAL CO-CHAIRS

It is a distinct honor to welcome you on behalf of the entire IEEE/CIC ICCC 2020 team to the ninth IEEE/CIC International Conference on Communications in China which is held in the fast-growing city of Chongqing, China, 9-11 August 2020. It is technically sponsored by the IEEE, IEEE Communications Society (ComSoc), China Institute of Communications (CIC), and technically co-sponsored by Chongqing University of Posts and Telecommunications (CQUPT), Chongqing University (CQU), China.

Recently, all of us have witnessed the remarkable innovations and rapid developments of communications. In particular, IEEE/CIC ICCC 2020 aims at addressing a key theme on "Intelligence Enabled Connections", which broadly covers all disciplines of communications from fundamental research to emerging applications, including the following eight symposiums: Communications Theory, Wireless Communications Systems, Mobile and Wireless Networks, Signal Processing for Communications, Next generation Networking and Internet, Internet of Things, Communication and Information Security, Selected Areas in Communications. In the keynote sessions, the five world renowned experts from academia and industry Prof. Abbas Jamalipour (Univesity of Sydney, Australia), Prof. Zhi Ding (University of California at Davis, USA), Prof. Xiaohu You (Southeast University, China), Prof. Jenq-Neng Hwang (University of Washington, USA), Dr. Zhenfei Tang (Senior Manager of 5G evolution research, Huawei) will deliver keynote addresses to present the latest and widest possible view on these technical areas.

IEEE/CIC ICCC 2020 has received more than 573 papers in total. To evaluate each submission, a review system was used and each paper was reviewed by at least 3 experts from the Technical Program Committee. The selection process followed strict criteria in all symposiums so only 281 papers were accepted. In total, all papers will be orally presented.

We thank all the authors and speakers for their technical contributions and the attendees for their participation. We are especially thankful to the keynote speakers and invited speakers for sharing their diverse expertise and keen visions in both academia and industry. Thanks also go to the effort and dedication of all organizers and volunteers. We truly hope you will have an intellectually stimulating experience at this conference and enjoy the technical as well as the social programs.

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Nei Kato (Tohoku University, Japan)

Qianbin Chen (Chongqing University of Posts and Telecommunications, China)

Tony Quek (Singapore University of Technology and Design, Singapore)

Yanchuan Zhang (China Institute of Communications, China)

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WELCOME MESSAGE FROM THE TPC CO-CHAIRS

On behalf of the Technical Program Committee, it is our great pleasure to welcome you to the ninth IEEE/CIC International Conference on Communications in China (ICCC 2020), in the mountain city of Chongqing. Under the theme of "Intelligence Enabled Connections", IEEE/CIC ICCC 2020 brings together researchers to discuss the latest advances in communications. The technical program of ICCC 2020 features 5 world-class keynote speeches, 8 technical symposiums, 7 tutorials, and 6 workshops. In addition, we have 7 invited talks delivered by 7 distinguished experts from academia and industry.

In this 9th edition of IEEE/CIC's flagship conference in China, we have maintained the high quality of the conference. We received 573 paper submissions from about 20 countries and regions. Out of these, 281 papers were accepted and included in the final program, corresponding to an acceptance rate of 49%. All the papers were carefully peer reviewed by about 276 TPC members and reviewers, with each paper evaluated by at least three reviewers. Within these accepted papers, we also have 3 invited papers by established experts in their fields. All these papers are organized into about 58 lecture-style oral sessions.

We are confident that you will find the technical program of IEEE/CIC ICCC 2020 very stimulating and inspiring. We warmly invite all of you to join us in interacting with the keynotes and invited speakers, and more importantly, interacting with all of your peer attendees. A technical program like this would not have been possible without the hard work and devotion of many of our organizing committee members and volunteers. We would like to especially thank the Symposium Chairs, Workshop Chairs, and Tutorial Chairs for their exceptional work. We would also like to express our sincere thanks to all the TPC members and reviewers for their help in the paper review process.

Finally, we wish to thank all the authors and attendees for participating in the conference. We hope you will have a fruitful and memorable experience at IEEE/CIC ICCC 2020.

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Ruyan Wang (Chongqing University of Posts and Telecommunications, China)

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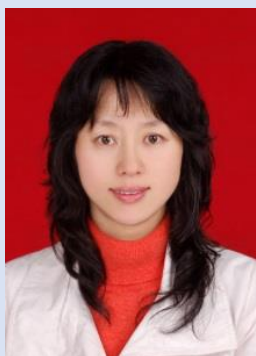
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& Telecom., China

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Telecommunications,
China

Lei Shu
Nanjing Agricultural
University, China &
University of Lincoln,
UK

Cuiqin Dai
Chongqing Univ. of Posts
& Telecom., China

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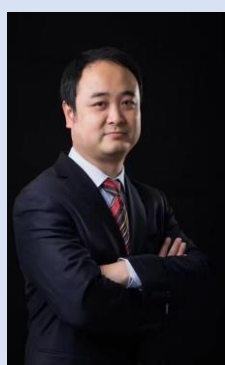
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Fen Hou
University of Macau, Macao

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North China Electric Power University, China

Celimuge Wu
University of Electro-Communications, Japan

Tutorial Co-Chairs
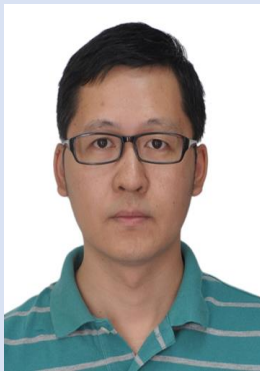
Sheng Zhou
Tsinghua University, China

Yipeng Zhou
Macquarie University, Australia

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CT: Communications Theory

Zhengchuan Chen
Chongqing University, China

Nan Zhao
Dalian University of Technology, China

Di Zhang
Zhengzhou University, China

SPC: Signal Processing for Communications

Feifei Gao
Tsinghua University, China

Jiankang Zhang
McMaster University, Canada

Jun Zhang
Nanjing University of Posts and Telecommunications, China

WCS: Wireless Communications Systems

Guan Gui
Nanjing University of Posts and Telecommunications, China

Tommy Svensson
Chalmers University of Technology, Sweden

Chuan Huang
University of Electronic Science and Technology of China, China

Zhongyuan Zhao
Beijing University of Posts and Telecommunications, China

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MWN: Mobile and Wireless Networks

Jiajia Liu
Northwestern Polytechnical
University, China

Dongmei Zhao
McMaster University, Canada

Xiaodong Xu
Beijing University of Posts and
Telecommunications, China

IoT: Internet of Things

Jihong Yu
Beijing Institute of Technology,
China
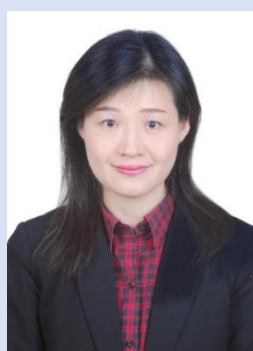
Li Wang
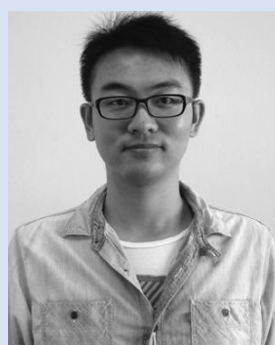Beijing University of Posts and
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Dapeng Wu
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CIS: Communication and Information Security

Zhou Su
Xi'an Jiaotong University, China

Chenxi Liu
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Guangxia Xu
Chongqing University of Posts
and Telecommunications, China

SAC: Selected Areas in Communications

Yuichi Kawamoto
Tohoku University, Japan

Jie Tang
South China University
of Technology, China

Tong Ye
Shanghai Jiao Tong
University, China
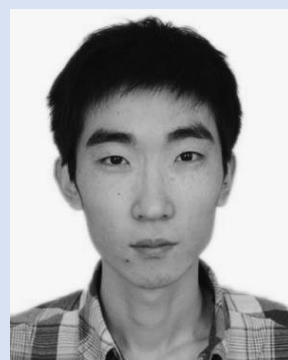
Jue Wang
Nantong University,
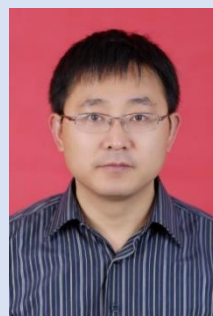China

NGNI: Next Generation Networking and Internet Symposium

Deze Zeng
China University of
Geosciences, China

Jianhua Tang
Seoul National
University, Korea

Songtao Guo
Chongqing University,
China

Guofeng Zhao
Chongqing University of
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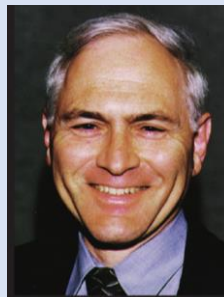
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Qinghe Du	Xi'an Jiaotong University	P.R. China

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Yi Jiang	Fudan University	P.R. China
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Taeyoon Kim	Korea University	Korea
Haneul Ko	Korea University	Korea
Thomas Kunz	Carleton University	Canada
Taesoo Kwon	Seoul National University of Science and Technology	Korea
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Ang Li	Xi'an Jiaotong University	P.R. China
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Dongxiao Liu	University of Waterloo	Canada
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Lei Liu	Japan Advanced Institute of Science and Technology	Japan
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Xiulong Liu	Tianjin University	P.R. China
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Zhi Liu	Shizuoka University	Japan
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Weidang Lu	Zhejiang University of Technology	P.R. China
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Yi Lu	Tampere University	Finland
Tom H. Luan	Xidian University	P.R. China
Chung-Horng Lung	Carleton University	Canada
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Osamu Muta	Kyushu University	Japan
Zhaolong Ning	The University of Hong Kong	Hong Kong, China
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Changyang She	University of Sydney	Australia
Boxiao Shen	University of Electronic Science and Technology of China	P.R. China
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Qifu Sun	University of Science and Technology Beijing	P.R. China
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Yuan Wu	University of Macau	Macau, China
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Xiaodong Xu	National Digital Switching System Engineering & Technological Research Center	P.R. China
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Ruiting Zhou	Wuhan University	P.R. China
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Fengchao Zhu	Tsinghua University	P.R. China

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Prof. Abbas Jamalipour

(IEEE Fellow, F-IEAust, The University of Sydney, Australia)

Date: Monday, 10 August, 2020
Time: 9:45-10:30

Empowering 5G Cellular Connectivity Through Intelligent Edge Computing and Aerial Support

Abstract: Fifth Generation Cellular Networks (5G) is gradually being implemented around the world, while at the same time research on the next generation or 6G has already been started. Although it would take some time before we get the full picture of credibility of 5G, researchers already know that it would suffer from a range of shortcoming with the introduction of new applications and thus; the need for work on its successor 6G. What we know and expect at this time is that we still need to make users closer to the network edges, thus the inclusion of edge computing; and that we need more autonomous and intelligent techniques in the form of advanced machine learning and artificial intelligence. At the same time, we know that terrestrial network components will have fundamentally physical limitations in providing coverage and accessibility needed in future networks. That would bring the involvement of more of aerial support including drones and low earth orbit satellites. This talk will provide some visionary concepts of the future mobile networks that contemplate edge computing and aerial support using results from some existing intelligent techniques.

Biography: Abbas Jamalipour is the chair Professor of Ubiquitous Mobile Networking at the University of Sydney, Australia, and holds a PhD in Electrical Engineering from Nagoya University, Japan. He is a Fellow of the Institute of Electrical and Electronics Engineers (IEEE), the Institute of Electrical, Information, and Communication Engineers (IEICE), and the Institution of Engineers Australia (IEA), an ACM Professional Member, and an IEEE Distinguished Speaker. He has authored nine technical books, eleven book chapters, over 550 technical papers, and five patents, all in the field of wireless communications. Dr. Jamalipour is the President and an elected member of the Board of Governors of the IEEE Vehicular Technology Society. He was the Editor-in-Chief IEEE Wireless Communications, Vice President-Conferences and a member of Board of Governors of the IEEE Communications Society. He serves as an Editor of IEEE Access, IEEE Transactions on Vehicular Technology, and several other journals. He has been a General Chair or Technical Program Chair for a number of conferences, including IEEE ICC, GLOBECOM, VTC, WCNC and PIMRC. He is the recipient of a number of prestigious awards such as the 2019 IEEE ComSoc Distinguished Technical Achievement Award in Green Communications, the 2016 IEEE ComSoc Distinguished Technical Achievement Award in Communications Switching and Routing, the 2010 IEEE ComSoc Harold Sobol Award, the 2006 IEEE ComSoc Best Tutorial Paper Award, as well as over fifteen Best Paper Awards.

Prof. Zhi Ding

(IEEE Fellow, University of California at Davis, USA)

Date: Monday, 10 August, 2020
Time: 10:30-11:15

Match-Making for Massive MIMO and Deep Learning

Abstract: The proliferation of advanced wireless services, such as virtual reality, autonomous driving and internet of things has generated increasingly intense pressure to develop intelligent wireless communication systems to meet networking needs posed by extremely high data rates, massive number of connected devices, and ultra low latency. Deep learning (DL) has been recently emerged as an exciting design tool to advance the development of wireless communication system with some demonstrated successes. In this talk, we introduce the principles of applying DL for improving wireless network performance by integrating the underlying characteristics of channels in practical massive MIMO deployment. We develop important insights derived from the physical RF channel properties and present a comprehensive overview on the application of DL for accurately estimating channel state information (CSI) of forward channels with low feedback overhead. We provide examples of successful DL application in CSI estimation for massive MIMO wireless systems and highlight several promising directions for future research.

Biography: Dr. Zhi Ding (S'88-M'90-SM'95-F'03, IEEE) is a Professor of Electrical and Computer Engineering at the University of California, Davis. He received his Ph.D. degree in Electrical Engineering from Cornell University in 1990. From 1990 to 2000, he was a faculty member of Auburn University and later, University of Iowa. Prof. Ding has held visiting positions in Australian National University, Hong Kong University of Science and Technology, NASA Lewis Research Center and USAF Wright Laboratory. His major research interests lie in the general field of signal processing and communications. Prof. Ding has active collaboration with researchers from many universities including those in Australia, China, Finland, Japan, Canada, Korea, and Singapore. He has coauthored over 400 technical papers and two books. Dr. Ding is a coauthor of the text: Modern Digital and Analog Communication Systems, 4th edition and 5th edition, Oxford University Press.

Dr. Ding is a Fellow of IEEE and has been an active member of IEEE, serving on technical programs of several workshops and conferences. He served both as a Member and also the Chair of the IEEE Transactions on Wireless Communications Steering Committee from 2007-2001. Dr. Ding was the Technical Program Chair of the 2006 IEEE Globecom and the General Chair of the 2016 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP). He served as an IEEE Distinguished Lecturer (Circuits and Systems Society, 2004-06, Communications Society, 2008-09). He received the 2012 Wireless Communications Recognition Award from the IEEE Communications Society. He currently also serves as the Chief Information Officer of the IEEE Communications Society.

Prof. Xiaohu You

(Southeast University, China)

Date: Monday, 10 August, 2020
Time: 11:15 - 12:00

From Shannon Theory to Future 6G's Technique Potentials

Abstract: From the perspective of Shannon theory and its extensions, this talk is devoted to evaluating the technique potentials of future 6G mobile communication system. Firstly, the classic Shannon theory framework, including performance tradeoff between block-length, data rate and reliability, is briefly summarized, and the limitations of its application in the contemporary mobile communication system are addressed. Secondly, the multiple-input-multiple-output (MIMO) extension of the classic Shannon theory is described, which has been playing the fundamental roles in the development of contemporary mobile communication systems. Furthermore, aiming at higher spectrum efficiency and power efficiency, higher reliability and lower latency, and higher frequency band, which are essential indicators of future 6G, the technique potentials are discussed theoretically from the perspective of Shannon theory framework. It reveals that by introducing more antennas together with the innovation of cell free network architecture, and by making effective balance between block length, error probability, data rate, and minimum number of antennas, future 6G technology still has great potential to be improved, but it needs both to make a compromise between system performance and deployment cost, and to carefully make use of the special features of MIMO channels in higher frequency band. Finally, several fundamental issues related to future 6G development are summarized.

Biography: Xiao-Hu You has been working with National Mobile Communications Research Laboratory at Southeast University, where now he holds the rank of director and professor. He has contributed over 100 IEEE journal papers and 3 books in the areas of signal processing and wireless communications. From 1999 to 2002, he was the Principal Expert of the C3G Project. From 2001-2006, he was the Principal Expert of the China National 863 Beyond 3G FuTURE Project. Since 2013, he has been the Principal Investigator of China National 863 5G Project.

Professor You served as the general chairs of IEEE WCNC 2013, IEEE VTC 2016 Spring and IEEE ICC 2019. Now he is Secretary General of the FuTURE Forum, vice Chair of China IMT-2020(5G) Promotion Group, vice Chair of China National Mega Project on New Generation Mobile Network. He was the recipient of the National 1st Class Invention Prize in 2011, and he was selected as IEEE Fellow in same year.

Prof. Jenq-Neng Hwang

(IEEE Fellow, University of Washington)

Date: Tuesday, 11 August, 2020
Time: 9:00 - 9:45

Mobile Edge Joint Exploration of Big IoT Data for Smart City Applications

Abstract: Thanks to the ultra-reliable low-latency communication (URLLC) capability of the emergent 5G mobile networks, the information derived from the roadside static surveillance or on-board moving IoT sensors (e.g., video cameras, Radars and Lidars), which can be jointly explored by the mobile edge computing (MEC) and real-time shared by all the local connected users for various smart city applications. To achieve this goal of coordinated mining of different modalities of IoT data, all of the detected/segmented and tracked human/vehicle objects need to be 3D localized in the world coordinate for effective 3D understanding of local dynamic evolutions. In this talk I will mainly talk about some challenges and potential solutions, more specifically, a robust tracking and 3D localization of detected objects, from either static/moving monocular video cameras, is proposed based on a variant of the Cascade R-CNN detector trained with triplet loss to obtain the accurate localization and the corresponding discriminating identity-aware features for tracking association, even with long-term occlusion, of each detected object in one-shot. When the cameras fail to reliably achieve these tasks due to poor lighting or adverse weather conditions, Radars and Lidars can offer more robust localization than the monocular cameras. However, the semantic information provided by the radio or point cloud data is limited and difficult to extract. In this talk, I will also introduce a radio object detection network (RODNet) to detect objects purely from radio signals captured by Radar based on an innovative cross-modal supervision framework, which utilizes the rich information extracted from the camera to teach object detection for Radar without tedious and laborious human labelling of ground truth on the Radar signals. Moreover, to compensate the disadvantage of Lidar detection on far-away small objects, effective integration of Lidar based detections, along with 2D object detections and 3D localization from monocular images based on 3D tracking associations, to achieve superior tracking and 3D localization performance. Finally, an efficient 3D human pose estimation for action description of detected human in natural monocular videos is also presented for finer-grained 3D scene understanding for smart city applications.

Biography: Dr. Jenq-Neng Hwang received the BS and MS degrees, both in electrical engineering, in 1981 and 1983 separately. He then received his Ph.D. degree from the University of Southern California. In the summer of 1989, Dr. Hwang joined the Department of Electrical and Computer Engineering (ECE) of the University of Washington in Seattle, where he has been promoted to Full Professor since 1999. He served as the Associate Chair for Research from 2003 to 2005, and from 2011-2015. He also served as the Associate Chair for Global Affairs from 2015-2020. He is the founder and co-director of the Information Processing Lab., which has won CVPR AI City Challenges awards in the past years. He has written more than 380 journal, conference papers and book chapters in the areas of machine learning, multimedia signal processing, and multimedia system integration and networking, including an authored textbook on "Multimedia Networking: from Theory to Practice," published by Cambridge University Press. Dr. Hwang has close working relationship with the industry on multimedia signal processing and multimedia networking.

Dr. Hwang received the 1995 IEEE Signal Processing Society's Best Journal Paper Award. He is a founding member of Multimedia Signal Processing Technical Committee of IEEE Signal Processing Society and was the Society's representative to IEEE Neural Network Council from 1996 to 2000. He is currently a member of Multimedia Technical Committee (MMTC) of IEEE Communication Society and also a member of Multimedia Signal Processing Technical Committee (MMSP TC) of IEEE Signal Processing Society. He served as associate editors for IEEE T-SP, T-NN and T-CSVT, T-IP and Signal Processing Magazine (SPM). He is currently on the editorial board of ZTE Communications, ETRI, IJDMB and JSPS journals. He served as the Program Co-Chair of IEEE ICME 2016 and was the Program Co-Chairs of ICASSP 1998 and ISCAS 2009. Dr. Hwang is a fellow of IEEE since 2001.

Mr. Zhenfei Tang

(senior manager of 5G evolution research, Huawei)

Date: Tuesday, 11 August, 2020
Time: 9:45 - 10:30

5G Evolution and Beyond

Abstract: The 5G has already been commercially deployed for more than one year. 3GPP Release 16 was completed in July 2020, which is a major release for 5G because it brought IMT-2020 submission – for an initial full 3GPP 5G system – to its completion.   3GPP 5G is evolving to next releases and is expected to open the door of digital transformation of many aspects of our life, industry, business, and even the whole society – the future of wireless of 5G evolution and beyond is yet to be discovered. Since the first generation of mobile technology, the mobile industry has experienced significant growth driven by 'subscription dividend' and 'traffic dividend'. The next dividend is believed to be the "connection dividend" or even "intelligence dividend". Not only the number of connected devices and objects will increasing rapidly, but also new applications and business opportunities will greatly emerge. More spectrum, such as new mid-band spectrum at 6GHz, FDD spectrum re-farming and even high frequency spectrum, will be available. 5G evolution and beyond will address those new use cases with advanced wireless technologies. The research challenges and technology breakthroughs required to deliver the vision for future wireless will be presented in this talk.

Biography: Mr. Zhenfei Tang is the senior manager of the 5G evolution research in Huawei. He has been engaged in the research and standardization for 3G, 4G and 5G wireless communications systems since he joined Huawei Technologies Co., Ltd in 2005. Mr. Tang was the major representative of Huawei in IMT-Advanced Promotion Group in China, and he led the promotion of TD-LTE from Huawei. He led 5G radio system design and managed a series of National projects from Huawei. Mr. Tang has more than 100 granted patents in the area of wireless communications. He received his M.S. degree from Beijing University of Posts and Telecommunications in 2004.

INVITED TALKS

Speaker:

Weisheng Hu (Shanghai Jiao Tong University, China)

Title:

A Comprehensive Optical Mobile Fronthaul Access Network

Abstract: Both cloud radio access network (C-RAN) and next generation fronthaul interface (NGFI) are the key solutions for the 5G deployment. In both architectures, the baseband units (BBUs) are centralized, and remote radio units (RRUs) are separately allocated, where the BBUs and RRUs are connected through a fronthaul network with Common Public Radio Interface (CPRI) and evolved eCPRI. In this work, we proposed a comprehensive optical mobile fronthaul access network (COMFAN) to meet the various fronthaul requirements. To support both the CPRI and eCPRI interfaces, several low-cost high bitrate optical transmission techniques are comparatively studied.

Speaker:

Hongbin Luo (Beihang University, China)

Title:

Toward a Trustworthy and Evolvable Future Internet

Abstract: Although the Internet has made great success since its inception, it faces many serious issues such as the lack of trustworthiness, the rigidity in deploying novel technologies at layer 3, as evidenced by the proliferation of various cyberattacks and the difficulty in deploying IPv6. These issues make it extremely difficult to further expand the Internet to satellite networks, industrial networks and vehicular networks because, as widely recognized, IP does not perform well in these network environments. In this talk, we present the core ideas of an architecture for a Trustworthy and Evolvable Future Internet.

Speaker:

Shanguo Huang (Beijing University of Posts and Telecommunications, China)

Title:

Resource Orchestration of Optical Networks with Multi-Access Edge Computing

Abstract: With the advent of the 5G, the traffic pressure on the bearer network is increasing. Meanwhile, the rapid development and large-scale application of IoT devices have brought about low-latency, high-reliability information processing and transmission requirements. Multi-access Edge Computing (MEC) introduced by sinking cloud resources from the Remote Cloud to the edge of the network is one of the solutions to support 5G low-latency applications. Optical networks with MEC is considered a promising candidate to meet the demanding bandwidth and latency requirements of future communications. At present, for optical networks with MEC, a key issue is how to provide services with lower latency and higher efficiency for end-users. Based on this, we investigate the resource orchestration and benefits of optical networks with MEC. This presentation first introduces the basic principle and characteristics of the optical network and Multi-access Edge Computing, then several resource orchestration schemes are explained in detail, and the simulation results are discussed at the end. The results show that the proposed schemes can effectively improve the resource utilization of the system while reducing user latency.

Invited Session-2
Session Chair: Xu Zhang
Date: Monday, 10 August, 2020
Time: 15:10-16:40
Room: virtual room 1

Speaker:

Qinyu Zhang (Harbin Institute of Technology, Shenzhen, China)

Title:

Optimal Scheduling of Mobile Edge Computing for Space Information Networks

Abstract: Mobile Edge Computing (MEC) is a promising solution to tackle the upcoming computing tsunami in space information network (SIN), by effectively utilizing the idle resource at the edge. In this work, we study such a multi-hop D2D-enabled MEC scenario for SIN, where mobile devices at network edge connect and share resources with each other via multi-hop D2D. We focus on the micro-task

scheduling problem in the multi-hop D2D-enabled MEC system, where each task is divided into multiple sequential micro-tasks, such as data downloading micro-task, data processing micro-task, and data uploading micro-task, according to their functionalities as well as resource requirements. We propose a joint Task Failure Probability and Energy Consumption Minimization problem (called TFP-ECM), which aims to minimize the task failure probability and the energy consumption jointly. To solve the problem, we propose several linearization methods to relax the constraints, and convert the original problem into an integer linear programming (ILP). Simulation results show that our proposed solution outperforms the existing solutions (with indivisible tasks or without resource sharing) in terms of both the total cost and the task failure probability.

Speaker:

Gangxiang Shen (Soochow University, China)

Title:

Key Technologies of Full-Band Optical Transmission Systems and Networking

Abstract: The transmission technology based on the traditional C-band standard single-mode fiber (SSMF) has approached its transmission capacity limit. However, the remaining capacity of an SSMF??s low-loss window is still abundant, up to 400 nm. To explore this potential capacity, this talk will introduce the key technical aspects that enable the full utilization of this full-band. The related technologies on transmission systems and networks are discussed.

Speaker:

Lilin Yi (Shanghai Jiao Tong University, China)

Title:

Neural Network-based equalizer for intensity modulation and direct detection systems

Abstract: The neural network (NN) has been widely used as a promising technique in fiber optical communication owing to its powerful learning capabilities. Specifically, the NN-based equalizer is qualified to mitigate mixed linear and nonlinear impairments, providing better performance than traditional algorithms, especially in intensity modulation and direct detection (IMDD) systems. Many demonstrations employ a traditional pseudo-random bit sequence (PRBS) as the test data. However, it has been revealed that the NN can learn the generation rules of the PRBS during training, resulting in abnormally high performance. So it is important to distinguish whether data features are learned by an NN model, what type

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of dataset can be used to avoid the above problem. After solving the data training issue, optimizing the NN structure to improve the equalization performance without improving the complexity becomes an important objective. In this talk, we analyze the detailed learning process when an NN is trained using a PRBS and determine the effect of the detection of generation rules. We then provide a mutual verification strategy to verify the training effectiveness and propose a combination strategy to construct a strong random sequence that will not be learned by the NN or other advanced algorithms.

Speaker:

Wei Feng (Tsinghua University, China)

Title:

Coordinated Transmission on the Ocean for Cell-Free Satellite-UAV-Terrestrial Networks

*Session: MWN-04

Abstract: Current maritime coverage mainly relies on onshore base stations (BSs) and marine satellites. The former could only cover limited offshore areas and the later usually lack of broadband communications capability. In this paper, we investigate a new usage of unmanned aerial vehicles (UAVs) under the hybrid satellite-UAV-terrestrial network architecture for better coverage on the ocean. Particularly, we adopt tethered UAVs coordinating with terrestrial BSs along the coastline, so as to liberate UAVs from harsh environments above the ocean and also provide additional aerial BS sites for facilitating the onshore-BS-sites scarcity problem. All spectrum is shared among satellites, UAVs and terrestrial BSs for elastic resource allocation and agile coverage. This hybrid network is irregular due to geographical limitations of terrestrial BSs and the deployment restriction of UAVs, thus leading to more challenging co-channel interference (CCI) for spectrum sharing than conventional cellular networks. We formulate a cell-free coordinated transmission regime, where multiple terrestrial BSs and UAVs form a virtual cluster to jointly serve a ship in a user-centric manner. Inter-cluster interference and leakage interference to satellite users are further mitigated by joint power allocation. The presented method requires only large-scale channel state information (CSI) and practically affordable computing cost, while offering a significant performance improvement in terms of system sum rate.

INVITED PAPERS

Invited Paper-1

Speaker:

Zuqing Zhu (University of Science and Technology of China, China)

Title: Privacy-Preserving Multilayer In-Band Network Telemetry and Data Analytics

Author: Xiaoqin Pan, Shaofei Tang and Zuqing Zhu (University of Science and Technology of China, China)

*Session: CIS-01

Abstract: As a new paradigm for the monitoring and troubleshooting of backbone networks, the multilayer in-band network telemetry (ML-INT) with deep learning (DL) based data analytics (DA) has recently been proven to be effective on real-time visualization and fine-grained monitoring. However, the existing studies on ML-INT\&DA systems have overlooked the privacy and security issues, i.e., a malicious party can apply tapping in the data reporting channels between the data and control planes to illegally obtain plaintext ML-INT data in them. In this paper, we discuss a privacy-preserving DL-based ML-INT&DA system for realizing AI-assisted network automation in backbone networks in the form of IP-over-Optical. We first show a lightweight encryption scheme based on integer vector homomorphic encryption (IVHE), which is used to encrypt plaintext ML-INT data. Then, we architect a DL model for anomaly detection, which can directly analyze the ciphertext ML-INT data. Finally, we present the implementation and experimental demonstrations of the proposed system. The privacy-preserving DL-based ML-INT&DA system is realized in a real IP over elastic optical network (IP-over-EON) testbed, and the experimental results verify the feasibility and effectiveness of our proposal.

Invited Paper-2

Speaker:

Jianguo Ma (Guangdong University of Technology, China)

Title: The Design-for-Cost of millimeter-wave Front-End for 5G and Beyond

Author: Jianguo Ma (Guangdong University of Technology, China)

*Session: SAC-02

Abstract: Millimeter-wave techniques and MIMO techniques are the key techniques for 5G and beyond. Fully integrated millimeter-wave front-ends are one of the key solutions for reducing the overall system costs and the sizes. It is not so challenging to realize working integrated millimeter-wave front-ends technically, the key of the success for 5G and beyond is the overall low cost for potential commercial implementations. Therefore, Design-for-Cost (DfC) becomes the key challenging. This paper compares the implementations basing on both CMOS 65nm and SiGe 0.18um technologies and the results show that the cost using CMOS 65nm is more than 3.3 times higher than that of using SiGe 0.18um, meanwhile, integrated millimeter-wave front-ends by using SiGe 0.18um technology have much better reliability than that of using CMOS 65nm.

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Speaker:

Jie Tang (South China University of Technology, China)

Title: Trajectory Planning of UAV in Wireless Powered IoT System Based on Deep Reinforcement Learning

Author: Jidong Zhang; Yu Yu; Zhigang Wang; Shaopeng Ao; Jie Tang; Xiuyin Zhang; Kai Kit Wong

*Session: CT-01

Abstract: In this paper, a UAV-assisted wireless powered communication system for IoT network is studied. Specifically, the UAV performs as base station (BS) to collect the sensory information of the IoT devices as well as to broadcast energy signals to charge them. Considering the devices' limited data storage capacity and battery life, we propose a multi-objective optimization problem that aims to minimize the average data buffer length, maximize the residual battery level of the system and avoid data overflow and running out of battery of devices. Since the services requirements of IoT devices are dynamic and uncertain and the system can not be full observed by the UAV, it is challenging for UAV to achieve trajectory planning. In this regard, a deep Q network (DQN) is applied for UAV's flight control. Simulation results indicate that the DQN-based algorithm provides an efficient UAV's flight control policy for the proposed optimization problem.

TUTORIALS

Tutorial Co-Chairs: Sheng Zhou, Yipeng Zhou
Virtual Room-1
Time: 09:00am-12:30am, 9 Aug. 2020
TUT-01: Age of Information as a New Data Freshness Metric in the IoT Era: From Theory to Implementation
Instructor(s):

Nikolaos Pappas
Linköping University, Sweden

He Chen
The Chinese University of Hong Kong, Hong Kong, China

Abstract: Internet of Things (IoT) represents one of the most significant paradigm shifts recently, which can revolutionize the information technology and several aspects of everyday life such as living, e-health and driving. Ericsson foresaw that by 2021, there will be around 28 billion IoT devices and a large share of them will be empowered by wireless communication technologies. As the most well-known application of the Internet of Things (IoT), remote monitoring is now pervasive. In IoT monitoring applications, information usually has a higher value when it is fresher. How to quantify the freshness and timeliness of information in IoT networks becomes of significant importance. Conventional performance metrics (e.g., throughput and delay) cannot adequately capture the information

freshness. In this context, the age of information (AoI) concept was proposed as a new metric to measure the information freshness at the destination side. AoI is a function of both how often packets are transmitted and how much delay packets experience in the system. Recent research on AoI suggests that well-known design principles of wireless networks based on traditional objectives, such as achieving high throughput, need to be re-examined if information freshness is the new target. This tutorial aims to present recent efforts on the applications, analysis, optimization and prototyping of the AoI metric for quantifying and evaluating the information freshness in wireless IoT networks, with a comprehensive coverage including the definition and promising applications of AoI, queueing theory-based AoI analysis, AoI for energy harvesting wireless networks, age-oriented multiuser scheduling in single-/multi-antenna systems. Representative work in these areas will be went through during the tutorial. Finally, we will introduce two prototyping testbeds, built on software-defined radio platforms and off-the-shelf WiFi systems respectively, for validating and evaluating AoI-oriented analysis, designs and optimizations in real office environments.

Virtual Room-2
Time: 09:00am-12:30am, 9 Aug. 2020
TUT-02: Privacy and Security in Federated Learning
Instructor(s):

Shi Jin
Southeast University, China
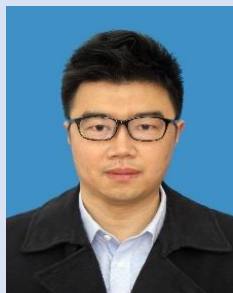
Jun Li
NJUST, China

Chuan Ma
NJUST, China

Abstract: Motivated by the advancing computational capacity of wireless end-user equipment (UE), as well as the increasing concerns about sharing private data, a new machine learning (ML) paradigm has emerged, namely federated learning (FL). Specifically, FL allows a decoupling of data provision at UEs and ML model aggregation at a central unit. By training model locally, FL is capable of avoiding direct data leakage from the UEs, thereby preserving privacy and security to some extend. However, even if raw data are not disclosed from UEs, individual's private information can still be extracted by some recently discovered attacks against the FL architecture. In this tutorial, we will provide three attractive sections to analyze the privacy and security issues in FL, and discuss several challenges on preserving privacy and security when designing FL systems. In addition, we provide extensive simulation results to showcase the discussed issues and possible solutions.

Virtual Room-3
Time: 09:00am-12:30am, 9 Aug. 2020
TUT-03: Wireless Communications with Intelligent Reflecting Surface
Instructor(s):

Caijun Zhong
Zhejiang University, China

Abstract: Intelligent reflecting surface (IRS) is an artificial planar structure made of sub-wavelength unit cells with adjustable electromagnetic responses, which has the potential to manipulate the propagation environments in an intelligent manner. Therefore, IRS has been envisioned as a promising technique to build spectral and energy efficient wireless communication systems, and has received considerable research interests from the community. Motivated by this, this tutorial aims to provide the audience a general picture of the recent developments in this exciting area. Specifically, in this interactive presentation we will address the following issues: We commence by introducing the basic of IRS, followed by its potential application scenarios in wireless communications. Then we elaborate on two major implementation architecture of IRS in wireless communications, namely, IRS enabled transceiver and IRS assisted communications. Later we discuss the potential integration of IRS with state-of-the-art transmission technologies, physical layer security, NOMA, SWIPT, two-way relaying, for example.

Virtual Room-4
Time: 09:00am-12:30am, 9 Aug. 2020
TUT-04: Sparsity Modulation for mmWave, Terahertz and Optical Wireless Communication
Instructor(s):
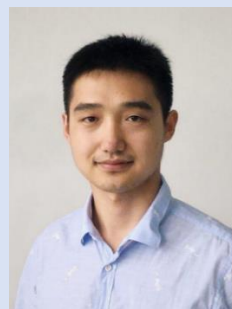
Shuaishuai Guo
Shandong University, China

Haixia Zhang
Shandong University, China

IEEE/CIC ICCC 2020

Shuping Dang
King Abdullah University of Science and Technology (KAUST), Saudi Arabia

Mohamed-Slim Alouini
King Abdullah University of Science and Technology (KAUST), Saudi Arabia

Abstract: Exploring millimeter wave (mmWave)/Terahertz /optical wireless communications paves the way to beyond 5G and 6G offering hundreds of Gbs up to Tbs transmission data rate. For communications at high frequency band, reducing the consumed power at the radio frequency front end becomes extremely urgent. In this tutorial, we will introduce a class of modulation techniques leveraging signal sparsity for modulation, with which the number of RF chains required for mmWave and Terahertz communications using massive number of antennas can be significantly reduced. Meanwhile, sparsity modulation can also be adopted to pulse/sub-carrier-based optical wireless communications under given average or peak optical power constraints, e. g., visible light communications with the eye-safety requirements. The emerged and newly emerging spatial modulation, beam space modulation, space-time-frequency index modulation, reflecting modulation, pulse position modulation, and robust pulse interval modulation all belong to the sparsity modulation family. In sparsity modulation, the non-zero positions of a signal can carry information besides the signal amplitude/phase/frequency/intensity of the non-zero signal. This has enabled a new dimension helping transmit extra bits with the non-zero signal positions. We will reveal different non-zero positions have different capabilities in carrying information, which will result in different capacities and error-protection properties by summarizing works on system capacity, error performance, bit-mapping design, constellation design, signal shaping optimization, and applications.

Virtual Room-1
Time: 14:00pm-17:30pm, 9 Aug. 2020
TUT-05: Information Freshness for IoT Networks: From Concept to Application
Instructor(s):

Tony Quek
Singapore University of Technology and Design (SUTD), Singapore
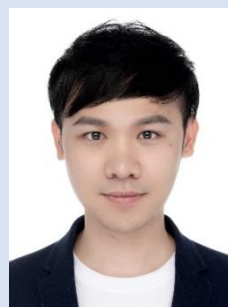
Howard H. Yang
Singapore University of Technology and Design (SUTD), Singapore

Xijun Wang
Sun Yat-sen University, Guangzhou, China

Chao Xu
Northwest A&F University, Yangling, China

Abstract: Being one of the key technologies of the next generation (5G) wireless networks, Internet of Things (IoT) has attracted significant attention from both academia and industry alike in recent years. In particular, IoT aims at enabling the ubiquitous connectivity among billions of things, ranging from tiny, resource-constrained sensors to more powerful smartphones and networked vehicles. With the help of IoT, devices can sense and even interact with the physical surrounding environment, thereby providing us with many valuable and remarkable context-aware real time applications at an efficient cost, such as automatic control of electric appliance, intelligent transportation network, and event monitoring and predication for health safety. For these applications, the staleness of obtained information at the destination nodes (e.g., monitors and actuators) inevitably deteriorates the accuracy and reliability of derived decisions, and leads to compromises in safety and security. As such, it is essential to perform freshness update collection, data delivery, and information extraction. Before an adequate response can be given to preserves freshness of information at the destinations, the primary requirement will be to properly measure the freshness of information and attain a full understanding of the effects of key system parameters in IoT networks, ranging from the status update generating, processing, to delivery, on the concerned information freshness. Recently, the Age of Information (AoI) has been proposed as a particular metric to quantify the information freshness in real time applications. This quantity measures the time elapsed since the latest received packet was generated from the sensor. In contrast to many conventional metrics for performance evaluation, e.g., throughput and delay, the AoI metric is defined from the receiver's perspective. To this end, it calls for additional efforts to study the distinguishing feature of AoI, construct appropriate models to analyze it and provide design guidelines, and more importantly, treat it as a novel metric for network deployment and optimization. In this tutorial, we will first provide the background about the definition and advantages of AoI and its variations for more general applications in IoT networks. Then, we will introduce some fundamental queueing models which are appropriate for analyzing the information freshness of some basic IoT networks. Finally, we will introduce different applications of the information freshness related metric, which facilitates the design and optimization of various IoT networks augmented by emerging techniques, e.g., edge caching and computing, unmanned aerial vehicles (UAVs), ect. We hope this tutorial will endow new researchers with a good understanding of the AoI when they enter this exciting area.

Virtual Room-2
Time: 14:00pm-17:30pm, 9 Aug. 2020
TUT-06: Cell-Free Massive MIMO Systems: A New Next-Generation Paradigm
Instructor(s):

Jiayi Zhang
Beijing Jiaotong University, China

Abstract: Cell-free (CF) massive multiple-input multiple-output (MIMO) systems have a large number of individually controllable antennas distributed over a wide area for simultaneously serving a small number of user equipment (UE). This solution has been considered as a promising next-generation technology due to its ability to offer a similar quality of service to all UEs, despite its low-complexity signal processing. In this tutorial, we provide a comprehensive survey of CF massive MIMO systems. To be more specific, the benefit of so-called of channel hardening and favorable propagation conditions are exploited. Furthermore, we quantify the advantages of CF massive MIMO systems in terms of their energy- and spectral-efficiency. Additionally, the signal processing techniques invoked for reducing the backhaul burden are analyzed. Finally, the open research challenges in both its deployment and network management are highlighted.

TUT-07: Reconfigurable Intelligent Surface for 6G: Communication, Sensing, and Localization

Instructor(s):

Boya Di
Imperial College London, London, UK

Hongliang Zhang
Princeton University, USA

Lingyang Song
Peking University, Beijing, China

Zhu Han
University of Houston, Texas, USA

Abstract: To spearhead the emergence of future intelligent communication and sensing platform, many advanced techniques have been investigated such as small cell and massive MIMO to support ubiquitous high-speed data services. However, their performances greatly depend on the dynamic and unpredictable wireless propagation. Against this background, reconfigurable intelligent surface (RIS) stands out as a novel approach to improve the quality of communication links and extend coverage. It is capable to actively shape the uncontrollable wireless environments into a desirable form via flexible phase shift reconfiguration without extra hardware or power costs. To better exploit the potential of such a technique, it is essential to develop distributed configuration, to design new protocols, to explore and implement suitable application scenarios, as well as to perform intelligent control and orchestration. This proposal will emphasize on RIS aided cellular communication and its applicability to a variety of IoT use cases. We will first give a comprehensive introduction of the RIS techniques by revealing its unique features compared to traditional antenna arrays. Second, RIS-aided communications will be discussed targeting at network capacity improvement and coverage extension from different aspects such as hybrid beamforming design and structure optimization. Third, two typical RIS-aided IoT applications will be developed, i.e., smart sensing and enhanced localization. Challenges on protocol design, signal processing, intelligent configuration, and implementation issues will be addressed.

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WORKSHOPS

Virtual-Room-1

Time: 09:00am-10:30am, 9 Aug. 2020

WS1-1 Terahertz Band Communication Networks, and 5G and 6G Channel Models

Session Chair: Chong Han

The Impact of Antenna Height on the Channel Model in Indoor Industrial Scenario

Tao Jiang; Lei Tian

Channel Characteristics Analysis of 60 GHz Wireless Communications in Staircase Environments

Cuiping Zhang; Jian Sun; Yu Liu; Wensheng Zhang; Cheng-Xiang Wang

Research on User Pairing of the Multi-User in Orbital Angular Momentum

Xiaoqian Wang; Liang Xia; Zhang Hao; Guangyi Liu

An Improved CDL Model for 5G Millimeter Wave Communication in a Substation Scenario

Zihao Fu; Hao Cui; Xiongwen Zhao; Yang Wang; Zhihui Wang

Map-based UAV mmWave Channel Model and Characteristic Analysis

Shan Jiang; Qiuming Zhu; Cheng-Xiang Wang

Virtual-Room-1

Time: 11:00am-12:30pm, 9 Aug. 2020

WS1-2 Terahertz Band Communication Networks, and 5G and 6G Channel Models

Session Chair: Xiongwen Zhao

Performance Analysis of UCA-Based Two-path OAM System under Misaligned Conditions

Chenhong Zhou; Xi Liao; Yang Wang; Jihua Zhou

On the Performance Analysis of Wireless Transmission over α-μ/Inverse Gamma Composite Fading Channels

Weijun Cheng; Xiaoting Wang; Xianmeng Xu

Analysis and Prospect for Application of Terahertz Band Technologies

Kaiyue Yan; Xiaonan Zhang; Fuchang Li; Zhonghao Zhang; Jingyan Ma

Indoor Office Propagation Channel Characteristics at 140GHz Band

Ziming Yu; Jia He; Guangjian Wang

Channel Estimation for Intelligent Reflecting Surface Enabled Terahertz MIMO Systems: A Deep Learning Perspective

Zhuoxun Li; Zhi Chen; Xinying Ma; Wenjie Chen

Virtual-Room-1

Time: 14:00pm-15:30pm, 9 Aug. 2020

WS2-1 5G and Beyond Technology-enabled e-Health (5GB e-Health)

Session Chair: Di Zhang

European 5G Healthcare Vertical Trials

Haesik Kim

A Network Slicing Strategy for Telemedicine based on Classification

Yajing Liu; Luhan Wang; XiangMing Wen

Virtual-Room-1

Time: 16:00pm-17:30pm, 9 Aug. 2020

WS2-2 5G and Beyond Technology-enabled e-Health (5GB e-Health)

Session Chair: Di Zhang

Neural Network Promotes the Transmission Quality of Remote Health Based on 5G Technology

Bohang Li; Gangcan Sun; Wanming Hao

Downlink User Matching and Power Allocation for Multicarrier NOMA-based Remote Health System

Gangcan Sun; Yapei Lv; Zhengyu Zhu

Cost Minimization for Remote Health Monitoring Under Delay and Reliability Constraints

Jingheng Zheng; Hui Tian; Wanli Ni; Yong Sun

A Low Complexity Algorithm for Time-Frequency Joint Estimation of CAF Based on Numerical Fitting

Zhengyu Zhang; Yongqing Zou; Renfei Zhang; Xin Wang

WS3-1 Network Softwarization for Internet of Things

Session Chair: Haotong Cao

Edge Intelligence for Vehicular Communication, Computation and Caching
Lei Liu

Some Key Technologies in Mobile Edge Computing
Jianbo Du

WS3-2 Network Softwarization for Internet of Things

Session Chair: Haotong Cao

Service Function Chain Embedding Framework for NFV-Enabled IoT Application
Yue Hu; Sijia Lou; Hengchen Wu; Longxiang Yang

Performance Analysis of Floodlight and Ryu SDN Controllers under Mininet Simulator
Yanzhen Li; Xiaobo Guo; Xue Pang; Bo Peng; Xiaoyue Li; Peiying Zhang

GAPG: A Heuristic Greedy Algorithm for Grouping Storage Scheme in Blockchain
Jinsen Dai; Dapeng Li; Rui Jiang; Xiaoming Wang; Youyun Xu

WS3-3 Network Softwarization for Internet of Things

Session Chair: Jianbo Du

A Practical Dynamic Clustering Scheme Using Spectral Clustering in Ultra Dense Network
Yanxia Liang; Xin Liu; Jing Jiang; Jianbo Du; Changyin Sun; Yongbin Xie

Nested Beam Selection Algorithm in Beamspace Millimeter wave Massive MIMO System
Hua He; Jing Jiang; Yanxia Liang

Resource Allocation for Virtualized Wireless Networks with Mobile Edge Computing
Xiaozhen Zhu; Longxiang Yang

Latency Optimization for Mobile Edge Computing Based Proximity Detection in Road Networks
Xitu Cheng; Yaqiong Liu; Guochu Shou; Yihong Hu

WS3-4 Network Softwarization for Internet of Things

Session Chair: Qin Wang

SDN-enabled Congestion Control Coordination and Coverage Class Adaptation in 5G NB-IoT Networks
Shangjing Lin; Jianguo Yu; Yuanxiang Chen; Jin Tian; Ji Ma

Power Control for Multi-UAV Location-aware Wireless Powered Communication Networks
Jiansong Miao; Pengjie Wang

Motivational Game-Theoretic Vehicle-to-Vehicle Energy Trading in the Smart Grid
Xinyi Ye; Yan Qi Zhang; Yiyang Ni; Qin Wang

A New Method of Human Gesture Recognition Using Wi-Fi Signals Based on XGBoost
Xue Ding; Ting Jiang; Wenling Xue; Zhiwei Li; Yi Zhong

WS4-1 2nd EBTSRA 2020: Second International Workshop on Emerging Blockchain Technology Solutions for Real-world Applications (EBTSRA)

Session Chair: Keping Yu

Trusted Computing with Commodity Hardware and Software - How Blockchain Can Help
Zhijun (William) Zhang

A Review on Blockchain for Medical Delivery Drones in 5G-IoT Era: Progress and Challenges
Partha Pratim Ray; Kien Nguyen

WS4-2 2nd EBTSRA 2020: Second International Workshop on Emerging Blockchain Technology Solutions for Real-world Applications (EBTSRA)

IEEE/CIC ICCC 2020

Empirical Analysis of Bitcoin Network (2016-2020)
Ajay Kumar; Kumar Abhishek; Pranav Nerurkar; Muhammad Rukunuddin Ghalib; Achyut Shankar; Zheng Wen; Xin Qi

Fighting COVID-19 and Helping Economy Reopen by Using Blockchain Technology
Weimin Xin

Deep Learning-based Management For Wastewater Treatment Plants Under Blockchain Environment
Keyi Wan; Zhiwei Guo; Jianhui Wang; Wenru Zeng; Xu Gao; Yu Shen; Keping Yu

Virtual-Room-3

Time: 14:00pm-15:30pm, 9 Aug. 2020

WS4-3 2nd EBTSRA 2020: Second International Workshop on Emerging Blockchain Technology Solutions for Real-world Applications (EBTSRA)

Session Chair: Keping Yu

PDKSAP: Perfected Double-Key Stealth Address Protocol without Temporary Key Leakage in Blockchain
Cong Feng; Tan Liang; Huan Xiao; Xin Qi; Keping Yu; Zheng Wen; You Jiang

Proof-of-Work Cryptocurrency Mining: A Statistical Approach to Fairness
Shengnan Li

Research on Network Security Protection Technology of Energy Industry Based on Blockchain
Ke Yang; Huimin Liao; Lihua Zhao; Shangzhuo Zheng; Hongwei Li

Virtual-Room-4

Time: 09:00am-10:30am, 9 Aug. 2020

WS5-1 2nd Workshop on 5G Meets AI/ML: Data-driven connectivity, computing and control

Session Chair: Rui Yin

Deep Reinforcement Learning for Energy Saving in Radio Access Network
Keran Zhang; Xiangming Wen; Yawen Chen; Zhaoming Lu

Vehicle Speed Prediction with Convolutional Neural Networks for ITS
Yifei Li, Celimuge Wu; Tsutomu Yoshinaga

Intelligent Universal Acceleration Framework and Verification for Edge Cloud Applications
Jie Mei; Bo Lei; Xuliang Wang; Qianying Zhao

A Location-aware Computation Offloading Policy for MEC-assisted Wireless Mesh Network
Wenxiao Shi; Sicheng Liu; Jiadong Zhang; Ruidong Zhang

Virtual-Room-4

Time: 11:00am-12:30pm, 9 Aug. 2020

WS5-2 2nd Workshop on 5G Meets AI/ML: Data-driven connectivity, computing and control

Session Chair: Rui Yin

Computation Offloading Scheme with D2D for MEC-enabled Cellular Networks
Minglei Tong; Xiaoxiang Wang; Yulong Wang; Yanwen Lan

Operation and Security Considerations of Federated Learning Platform Based on Compute First Network
Lei Zhu; Hui Xue; Yong Pang; Lijun Zhao, Zhengpeng You; Xiaoyong Tang

Robust Adaptive Beamforming Based on Norm Constraint Regularization Correntropy for Impulsive Interference
Yingke Lei

Virtual-Room-4

Time: 14:00pm-15:30pm, 9 Aug. 2020

WS6-1 Workshop on Optical Wireless Communication (OWC)

Session Chair: Chen Gong

A Comprehensive Accuracy Analysis of Visible Light Positioning under Shot Noise
Xiaona Liu; Difan Zou; Nuo Huang; Sha Zhang

Dynamic Optical Wireless Communication Channel Characterization Through Air-Water Interface
Tianrui Lin; Chen Gong; Jianghua Luo; Zhengyuan Xu

Design of DBN based Demodulator in Underwater Wireless Optical Communications
Shuai Ma; Zhongdan Zhang; Hang Li; Jing Xu; Han Zhang; Sha Zhang; Shiyin Li

Indoor Visible Light Communication Scheduling for IOT Scenarios with Short Blocklength

Shiyao Chang; Chen Gong; Nuo Huang; Zhengyuan Xu

WS6-2 Workshop on Optical Wireless Communication (OWC)

Session Chair: Fang Yang

Optimum Signal Shaping in Double-Sided Clipping DCO-OFDM

Shuo Li; Xintong Ling; Pengfei Ge; Jiaheng Wang; Xiqi Gao

Experimental Study on Wavefront Distortion Correction of 40-Elements Adaptive Optical System Based on SPGD Algorithm

Jun Li; Jianghua Luo; Zhenheng Xu; Xiuhua Yuan

Design and Implementation of a Rolling Shutter Based Image Sensor Communication System

Xixi Li; Weijie Liu; Zhengyuan Xu

Optical Rogue Waves in the non-line-of-sight Scattering and Turbulence Channels

Shangbin Li; Chen Gong; Boyang Huang; Difan Zou; Kun Wang; Zhengyuan Xu

IEEE/CIC ICCC 2020

ICCC2020 TECHNICAL PROGRAM

The Ninth IEEE/CIC ICCC Technical Program
Date: 10-11 Aug. 2020

Virtual Room 1
Time: 13:00pm-15:30pm, 10 Aug. 2020
IT-01
SESSION CHAIR: Xiaoxue Gong

A Comprehensive Optical Mobile Fronthaul Access Network

Weisheng Hu

Abstract: Both cloud radio access network (C-RAN) and next generation fronthaul interface (NGFI) are the key solutions for the 5G deployment. In both architectures, the baseband units (BBUs) are centralized, and remote radio units (RRUs) are separately allocated, where the BBUs and RRUs are connected through a fronthaul network with Common Public Radio Interface (CPRI) and evolved eCPRI. In this work, we proposed a comprehensive optical mobile fronthaul access network (COMFAN) to meet the various fronthaul requirements. To support both the CPRI and eCPRI interfaces, several low-cost high bitrate optical transmission techniques are comparatively studied.

Toward a Trustworthy and Evolvable Future Internet

Hongbin Luo

Abstract: Although the Internet has made great success since its inception, it faces many serious issues such as the lack of trustworthiness, the rigidity in deploying novel technologies at layer 3, as evidenced by the proliferation of various cyberattacks and the difficulty in deploying IPv6. These issues make it extremely difficult to further expand the Internet to satellite networks, industrial networks and vehicular networks because, as widely recognized, IP does not perform well in these network environments. In this talk, we present the core ideas of an architecture for a Trustworthy and Evolvable Future Internet.

Resource Orchestration of Optical Networks with Multi-Access Edge Computing

Shanguo Huang

Abstract: With the advent of the 5G, the traffic pressure on the bearer network is increasing. Meanwhile, the rapid development and large-scale application of IoT devices have brought about low-latency, high-reliability information processing and transmission requirements. Multi-access Edge Computing (MEC) introduced by sinking cloud resources from the Remote Cloud to the edge of the network is one of the solutions to support 5G low-latency applications. Optical networks with MEC is considered a promising candidate to meet the demanding bandwidth and latency requirements of future communications. At present, for optical networks with MEC, a key issue is how to provide services with lower latency and higher efficiency for end-users. Based on this, we investigate the resource orchestration and benefits of optical networks with MEC. This presentation first introduces the basic principle and characteristics of the optical network and Multi-access Edge Computing, then several resource orchestration schemes are explained in detail, and the simulation results are discussed at the end. The results show that the proposed schemes can effectively improve the resource utilization of the system while reducing user latency.

Virtual Room 1
Time: 15:10pm-16:40pm, 10 Aug. 2020
IT-02
SESSION CHAIR:Xu Zhang

Optimal Scheduling of Mobile Edge Computing for Space Information Networks

Qinyu Zhang

Abstract: Mobile Edge Computing (MEC) is a promising solution to tackle the upcoming computing tsunami in space information network (SIN), by effectively utilizing the idle resource at the edge. In this work, we study such a multi-hop D2D-enabled MEC scenario for SIN, where mobile devices at network edge connect and share resources with each other via multi-hop D2D. We focus on the micro-task scheduling problem in the multi-hop D2D-enabled MEC system, where each task is divided into multiple sequential micro-tasks, such as data downloading micro-task, data processing micro-task, and data uploading micro-task, according to their functionalities as well as

resource requirements. We propose a joint Task Failure Probability and Energy Consumption Minimization problem (called TFP-ECM), which aims to minimize the task failure probability and the energy consumption jointly. To solve the problem, we propose several linearization methods to relax the constraints, and convert the original problem into an integer linear programming (ILP). Simulation results show that our proposed solution outperforms the existing solutions (with indivisible tasks or without resource sharing) in terms of both the total cost and the task failure probability.

Key Technologies of Full-Band Optical Transmission Systems and Networking

Gangxiang Shen

Abstract: The transmission technology based on the traditional C-band standard single-mode fiber (SSMF) has approached its transmission capacity limit. However, the remaining capacity of an SSMF's low-loss window is still abundant, up to 400 nm. To explore this potential capacity, this talk will introduce the key technical aspects that enable the full utilization of this full-band. The related technologies on transmission systems and networks are discussed.

Neural Network-based equalizer for intensity modulation and direct detection systems

Lilin Yi

Abstract: The neural network (NN) has been widely used as a promising technique in fiber optical communication owing to its powerful learning capabilities. Specifically, the NN-based equalizer is qualified to mitigate mixed linear and nonlinear impairments, providing better performance than traditional algorithms, especially in intensity modulation and direct detection (IMDD) systems. Many demonstrations employ a traditional pseudo-random bit sequence (PRBS) as the test data. However, it has been revealed that the NN can learn the generation rules of the PRBS during training, resulting in abnormally high performance. So it is important to distinguish whether data features are learned by an NN model, what type of dataset can be used to avoid the above problem. After solving the data training issue, optimizing the NN structure to improve the equalization performance without improving the complexity becomes an important objective. In this talk, we analyze the detailed learning process when an NN is trained using a PRBS and determine the effect of the detection of generation rules. We then provide a mutual verification strategy to verify the training

effectiveness and propose a combination strategy to construct a strong random sequence that will not be learned by the NN or other advanced algorithms.

Virtual Room 1
Time: 16:50pm-18:20pm, 10 Aug. 2020

CT1: Vehicular Communications
SESSION CHAIR: Chunhui Li, Zhuo Sun

Invited Paper: Trajectory Planning of UAV in Wireless Powered IoT System Based on Deep Reinforcement Learning

Jidong Zhang; Yu Yu; Zhigang Wang; Shaopeng Ao; Jie Tang; Xiuyin Zhang; Kai Kit Wong

Task Offloading for Vehicular Edge Computing: A Learning-Based Intent-Aware Approach

Wenxuan Kong; Lurui Jia; Zhenyu Zhou; Haijun Liao

Graph-based Resource Allocation For V2X Communications In Typical Road Scenarios

Yang Jiang; Shangjun Hao; Qingwen Han

Joint 3D Placement and Power Allocation for UAV-aided MIMO-NOMA Networks

Fusheng Zhu; Zhigang Wang; Wanmei Feng; Jie Tang; Yuan Liu; Xiuyin Zhang

Reliability Performance of Transmitter Selection in Wireless Vehicular Networks

Zhifeng Tang; Zhuo Sun; Chunhui Li; Nan Yang

Virtual Room 2
Time: 13:30pm -15:00pm, 10 Aug. 2020
WCS-01: Intelligent Reflecting Surface
SESSION CHAIR: Yongjun Xu, Jiao Wu

Artificial Noise-Aided Secure SWIPT Communication Systems Using Intelligent Reflecting Surface

YueXiu; Jiao Wu; Guan Gui; Ning Wei; Zhongpei Zhang

Beamforming Design for Intelligent Reflecting Surface Aided Multi-Antenna MU-MIMO Communications with Imperfect CSI

PiaoZeng; Deli Qiao; Haifeng Qian

Energy-efficient Resource Allocation for Secure IRS Networks with Active Eavesdropper

Jianhong Yang; YongjunXu; Qilie Liu; Guoquan Li; Haijian Sun

Performance of Massive MIMO System with Cross-layer Design over Composite Rayleigh Fading Channel

Hui Wang; Xiangbin Yu; Yuheng Du; Xiaoyu Dang

Multi-objective Conflict Coordination in Radio Access Networks
Falu Xiao; Shi Yan; Mugen Peng; Xueyan Cao; Yajuan Qiao

WCS-02: Intelligence Communications I

SESSION CHAIR:Jing Jiang, Guan Gui

Deep Learning Assisted Hybrid Precoding with Dynamic Subarrays in mmWave MU-MIMO System
Jing Jiang; Yun Yang

BLDnet: Robust Learning-Based Detection for High-Order QAM With Nonlinear Distortion
Longhao Zou; Ming Jiang; Chunming Zhao; Yuan He; Desen Zhu; Qisheng Huang

DNN Based Iterative Detection for High Order QAM OFDM Systems with Insufficient Cyclic Prefix
HuanCai; Chunming Zhao; Wei Shi

A Novel Neural Network Denoiser for BCH codes
Hongfei Zhu; Zhiwei Cao; Yuping Zhao; Do Li

A Deep Learning based Resource Allocation Algorithm for Variable Dimensions in D2D-Enabled Cellular Networks
Errong Pei; GuangCai Yang

WCS-03: Intelligence Communications II

SESSION CHAIR: Xiaochuan Sun, Ning Zhang

Dynamic Spectrum Access Scheme of Joint Power Control in Underlay Mode Based on Deep Reinforcement Learning
Xiping Chen; Xian-Zhong Xie; Zhaoyuan Shi; Zishen Fan

A Stacking Ensemble Learning Model for Mobile Traffic Prediction
Zhigang Li; Di Cai; Jialin Wang; Jingchang Fu; Linlin Qin; Duomin Fu

Channel Estimation Based on Improved Compressive Sampling Matching Tracking for Millimeter-wave Massive MIMO
Yong Liao; Lei Zhao; Haowen Li; Fan Wang; Guodong Sun

3D Deployment with Machine Learning and System Performance Analysis of UAV-Enabled Networks
Xuan Li; Jie Liu; Wenqi Zhang

WCS-04: NOMA

SESSION CHAIR: Miao Liu, Chuan Huang

Buffer-Aided Cooperative Non-Orthogonal Multiple Access for Downlink Transmission
Yunwu Wang; Peng Xu; Jianping Quan; Gaojie Chen

Four-dimensional Modulation Superposition NOMA Scheme with Non-ideal Channel Estimation
Jiyuan Sun; Jun Zou; Jing Qu; Meng Li; Chen Xu

A Serially Concatenated NOMA scheme for Cluster-Based Vehicular Communications
Zhe Yan; Zhongwei Si

Hardware-Efficient Hybrid Precoding and Power Allocation in Multi-User mmWave-NOMA Systems
Xiaolei Qi; Gang Xie; Yuanan Liu

Fairness Resource Allocation Scheme for GBR Services in Downlink SCMA System
Chenju Chen; Hui Tian; Gaofeng Nie

WCS-05: UAV Aided Wireless Communications

SESSION CHAIR: Haipeng Yao, Jinlong Sun

UAV Deployment Design for Maximizing Effective Data with Delay Constraint in a Smart Farm
Junwei Zhao; Ying Wang; Zixuan Fei; Xue Wang

Joint Task and Resource Allocation in SDN-based UAV-assisted Cellular Networks
Yujiao Zhu; Sihua Wang; Xuanlin Liu; Haonan Tong; Changchuan Yin

Multi-UAV Deployment for MEC Enhanced IoT Networks
Lei Yang; Haipeng Yao; Xing Zhang; Jingjing Wang; Yunjie Liu

D2D-enabled Multicast Optimal Scheduling in mmWave Cellular Networks
Songling Zhang; Danpu Liu; Jie Lv; Zhilong Zhang

WCS-06: Channel Modeling

SESSION CHAIR:Hao Jiang, Jianhua Zhang

Experimental Performance of the Tri-Polarized MIMO Channel in UMi Scenario at 4.9 GHz

Zuolong Ying; Yuxiang Zhang; Pan Tang; Zhen Zhang; Jianhua Zhang; Lei Tian; Guangyi Liu; Yi Zheng

Ray-Tracing Based Millimeter-Wave Channel Characteristics in Subway Carriage

Zhiyi Yao; Xiong Lei; Haiyang Miao

Channel Characteristics of Subway Station Based on Ray-Tracing at 5G mmWave Band

Haiyang Miao; Xiong Lei

A Novel 3D Non-stationary Single-twin cluster Model for Mobile-mobile MIMO Channels

Yongji Wang; Zhi-Zhong Zhang; Haonan Hu

A Low Complexity Joint Iterative Multi-User Detection Decoding Receiver Based on Verified Message

Jiansong Miao; Xuejia Hu; Weijie Li; Hairui Li

Virtual Room 4

Time: 13:30pm -15:00pm, 10 Aug. 2020

MWN-01: Localization

SESSION CHAIR: Bin Li, Weidong Gao

Multi-Source Data Fusion Method for Indoor Localization System

Jishi Cui; Bin Li; Lyuxiao Yang; Nan Wu

Carrier Phase-based Wi-Fi Indoor Localization Method

Wei He; Ziying Yue; Zengshan Tian; Zhenya Zhang

Three-dimensional DV-Hop Localization Based on Improved Lion Swarm Optimization Algorithm

Falei Ji; Mingyan Jiang

A Fingerprint Database Construction Method Based on Universal Kriging Interpolation for Outdoor Localization

Qing Wu; Gang Chuai; Weidong Gao

D2D Cooperative Localization Approach Based on Euclidean Distance Matrix Completion

Yaohua Li; Liangbo Xie; Mu Zhou; Qing Jiang

Virtual Room 4

Time: 15:10pm -16:40pm, 10 Aug. 2020

MWN-02: Edge Computing

SESSION CHAIR: Chi Zhang, Xuefei Zhang

Moving Server: Follow-up Computation Offloading Paradigm for Vehicular Users

Xuefei Zhang; Weilong Lin; Yijing Li; Qimei Cui; Xiaofeng Tao; Xueqing Huang; Pinyi Ren

Multi-Armed Bandits Scheme for Tasks Offloading in MEC-enabled Maritime Communication Networks

Shan Gao; Tingting Yang; Hua Ni; Genglin Zhang

A QoE-based DASH Multicast Grouping Algorithm for Mobile Edge Computing

Lei Xu

Decentralized Computation Offloading and Resource Allocation in MEC by Deep Reinforcement Learning

Yeteng Liang; Yejun He; Xiaoxu Zhong

Traffic Optimization for In-flight Internet Access via Air-to-Ground Communications

Kai Wan; Zhen Wang; Yuanyuan Wang; Chi Zhang; Jianqing Liu

Virtual Room 4

Time: 16:50pm -18:20pm, 10 Aug. 2020

MWN-03: Internet of Vehicles

SESSION CHAIR: Yaping Cui, Fan Jiang

Convergence Estimation of Ergodic Capacity for Vehicle-Mounted APs: Large Deviation Theory

Jun Dai; Lijun Wang; Wei He; Tao Han

Machine Learning based Resource Allocation Strategy for Network Slicing in Vehicular Networks

Yaping Cui; Xinyun Huang; Dapeng Wu; Hao Zheng

Q-Learning Based Task Offloading and Resource Allocation Scheme for Internet of Vehicles

Fan Jiang; Wei Liu; Junxuan Wang; Xinying Liu

Design and Optimization of Edge Computing for Data Fusion in V2I Cooperative Systems

Qun Zhang; Zhiyong Chen; Bin Xia; Xin Jiang; Chengfeng Xiong

A Novel 3D Non-stationary Channel Model with UPA for Massive MIMO V2V Communication in Crossroads Scattering Environments

Fan Liu; Nan Ma; Jianqiao Chen; Lulu Gu

Virtual Room 5

Time: 13:30pm-15:00pm, 10 Aug. 2020

SPC-01: NOMA

SESSION CHAIR: Shun Zhang, Feifei Gao

Low Density Superposition Modulation using DCT for 5G NOMA scheme

Kun Lu; Sheng Wu; Lihong Lv; Hongwen Yang

Non-orthogonal Multiple Access in SWIPT

Enabled Cooperative D2D Network

Rui Cheng; Xiaotian Zhou; Haixia Zhang; Fang Fang; Dongfeng Yuan

Block Error Rate Analysis of Short-Packet NOMA Communications with Imperfect SIC

Ruiqiang Fu; Qiao Qi; Caijun Zhong; Xiaoming Chen; Zhaoyang Zhang

Angle-Delay-Doppler Domain NOMA over Massive MIMO-OTFS Networks

Weidong Shao; Shun Zhang; Caijun Zhong; Xianfu Lei; Pingzhi Fan

NDA-EVM based Co-channel Interference Analysis in Co-frequency Network

Xiaoping Zeng; Shiqi Li; Xin Jian; Yang Fan

Data-enhanced Bayesian MIMO-OFDM Channel Estimation Strategy with Universal Noise Model

Jia-Cheng Jiang; Hui-Ming Wang

A New Real-Time Acoustic Echo Cancellation Algorithm Using Blind Source Separation and Multi-delay Filter

Xiuxiang Yang

Low Complexity Activity Detection for Massive Access with Massive MIMO

Yongxin Liu; Shidong Zhou

Max-Min Energy-Efficient Multi-Cell Massive MIMO Transmission Exploiting Statistical CSI

Yufei Huang; Li You; Jiayuan Xiong; Wenjin Wang; Xiqi Gao

Analysis on Functions and Characteristics of the Rician Phase Distribution

Zhongtao Luo; Yanmei Zhan; Edmond Jonckheere

Deep Learning based Intelligent Recognition Method in Heterogeneous Communication Networks

Hao Gu; Yu Wang; Sheng Hong; Yongjun Xu; Guan Gui

Massive MIMO Data Detection Using 1-dimensional Convolutional Neural Network

Isayiyas Nigatu Tiba; Ben Baraka Kulimushi; Chrianus Kajuna

Location Aided Intelligent Deep Learning Channel Estimation for Millimeter Wave Communications

Xintong Lin; Lin Zhang; Yuan Jiang

Message Structure Aided Attentional Convolution Network for RF Device Fingerprinting

Lintianran Weng; Jianhua Peng; Jinsong Li; Mingyan Xu; Yuhang Zhu

Research on Human Activity Recognition Technology under the Condition of Through-the-wall

Ruoyu Cao; Xiaolong Yang; Zhenhua Yang; Mu Zhou; Liangbo Xie

An Oblivious Game-Theoretic Perspective of RRM in Vehicular Communications

Xianfu Chen; Celimuge Wu

A Hybrid Routing Algorithm in Terrestrial-Satellite Integrated Network

Huihui Xu; Deshi Li; Mingliu Liu; Guangjie Han; Wei Huang; Chan Xu

A Synergic Architecture for Content Distribution in Integrated Satellite and Terrestrial Networks

Siyu Yang, Hewu Li, Zeqi Lai; Jun Liu

A Novel Resource Allocation Scheme With Unmanned Aerial Vehicles in Disaster Relief Networks

Zhou Su, Minghui Dai; Qichao Xu; Ruidong Li

A Learnable Gauss-Seidel Detector for MIMO Detection

Qi Wang; Han Hai; KaiZhi Peng; Binbin Xu; Xueqin Jiang

A BPSO-based Controller Placement Algorithm for Hierarchical Service Function Chaining

Guanwen Li; Bohao Feng; Fan Wu; Huachun Zhou

Community Detection for Information Propagation Relying on Particle Competition

Wenzheng Li; Jingjing Wang; Yong Ren; Dechun Yin; Yijun Gu

AODC: Automatic Offline Database Construction for Indoor Localization in a Hybrid UWB/Wi-Fi Environment

Huilin Jie; Kai Liu; Hao Zhang; Ruitao Xie; Weiwei Wu; Songtao Guo

Cache pollution prevention mechanism based on cache partition in V-NDN

Jie Zhou; Jiangtao Luo; LiangLang Deng; Junxia Wang

Identity-based Secret Sharing Access Control Framework for Information-Centric Networking

LiangLang Deng; Jiangtao Luo; Jie Zhou and Junxia Wang

A Security Trust Mechanism for Data Collection with Mobile Vehicles in Smart City

Qingyong Deng; Shaobo Huang, Shujuan Tian, Haolin Liu; Jianglian Cao; Shuwen Jia

Multi-dimensional Security Risk Assessment Model Based on Three Elements in the IoT System

WenJie Kang; JiaLe Deng; PeiDong Zhu; Xuchong Liu; Wei Zhao; Zhi Hang

HABEm: Hierarchical Attribute Based Encryption with Multi-Authority for the Mobile Cloud Service

Qian He; Jing Song; Hong Xu;Yong Wang

User Authentication Leveraging Behavioral Information using Commodity WiFi devices

Shulin Yang; Yantong Wang; Xiaoxiao Yu; Yu Gu; Fuji Ren

Reverse Auction for Cloud-Based Traffic Offloading in Hybrid Satellite-Terrestrial Networks

Cui-Qin Dai; Lan Jin; Qianbin Chen

Towards Ubiquitous Coverage of High Altitude Platforms Aided 5G+ for Massive Internet of Things: A Cell Perspective

Wei Wu; Qinyu Zhang; Kai Wang; Weizhi Wang

Sum Rate Maximization via Reconfigurable Intelligent Surface in UAV Communication: Phase Shift and Trajectory Optimization

Jingyi Li; Jiajia Liu

Drift Compensation Algorithm Based on Time-Wasserstein Dynamic Distribution Alignment

Tao Yang; Kewei Zeng; Zhifang Liang

A Robust Timing Synchronization Method for OFDM systems Over Multipath Fading Channels

Han Yang; Lintao Li; Jiaxuan Li

Protocol-Aware Backscatter Communication Using Commodity Radios

Longzhi Yuan; Rongrong Zhang; Kai Yang; Jianping An; Si Chen; Wei Gong

Joint Power Control and Time Allocation for WBANs with RF Energy Harvesting

Rongrong Zhang; Xinglong Li

Joint Beamforming and Phase-Shifting Optimization in MISO with RIS-Assisted Communication

Keha Wang; Zhenhua Xiong; Zhixin Hu; Xueyan Chen; Lin Chen

A Novel Link-Selection Strategy for DCSK-SWIPT Relay System with Buffer

Mi Qian; Guofa Cai; Yi Fang; Guojun Han

Performance Analysis of A SLIPT-Based Hybrid VLC/RF System

Huijie Peng; Qiang Li; Ashish Pandharipande; Xiaohu Ge; Jiliang Zhang

An Intelligent Prediction Method for Device Status Based on IoT Temporal Knowledge Graph

Shujuan You; Xiaotao Li; Wai Chen

Access Authentication Architecture Design of Industrial Internet Identification and Resolution

System
Baoluo Ma

Interactive Attention Encoder Network with Local Context Features for Aspect-Level Sentiment Analysis
Ruyan Wang; Zhongyuan Tao

Fast Recovery of Low-Rank and Joint-Sparse Signals in Wireless Body Area Networks
Yanbin Zhang; Longting Huang; Yangqing Li; Kai Zhang; Changchuan Yin

Multi-sensor Data Fusion Algorithm Based on Adaptive Trust Estimation and Neural Network
Xuexin Zhao; Junhua Wu; Maoli Wang; Guangshun Li; Haili Yu; Wenzhen Feng

Invited Paper: Privacy-Preserving Multiplayer In-Band Network Telemetry and Data Analytics
Xiaoqian Pan; Shaofei Tang; Zuqing Zhu

Enhanced p-Sensitive k-Anonymity Models for Achieving Better Privacy
Nan Wang; Haina Song; Tao Luo; Jinkao Sun; Jianfeng Li

Efficient Privacy-Preserving Searchable Encryption Scheme Based on Reversible Sorting Policy in Cloud Storage
Cao Laicheng, Qirui Wu, Yafei Wang; Guo Xian

Dual Privacy-Preserving Health Data Aggregation Scheme Assisted by Medical Edge Computing
Chengzhe Lai; Jinke Wan; Dong Zheng

Private, Fair, and Verifiable Aggregate Statistics for Mobile Crowdsensing in Blockchain Era
Miao He; Jianbing Ni; Dongxiao Liu; Haomiao Yang; Sherman Shen

Coordinated Multi-Point Secure Transmissions in mmWave Cellular Networks
Hao-Wen Liu; Tong-Xing Zheng; Yating Wen; Shaodi Wang; Zhaowei Wang; Hui-Ming Wang

Hybrid Precoding Design for Security MU-MISO SWIPT Millimeter Wave Systems
Chi Zhang; Zhengyu Zhu; Ning Wang

A Stigmergy Learning Approach at the Edge: Securely Cooperative Caching for Fog Radio Access Networks
Yajuan Qiao; Yang Liu; Mugen Peng; Wenyun Chen; Falu Xiao

Towards High-efficient QoT Prediction of Wide-area Optical Backbone Network: A Reservoir Computing View
Yingqi Li; Jialin Wang; Cai Di; Zhigang Li; Duomin Fu; Linlin Qin

GATAE: Graph Attention-based Anomaly Detection on Attributed Networks
Ziquan You; Xiaoying Gan; Luoyi Fu; Zhen Wang

Secure Transmission Based on Non-Overlapping AOA in Cell-Free Massive MIMO Networks
Jiahua Qiu; Kui Xu; Xiaochen Xia

Secure Cognitive Communication via Cooperative Jamming
Keting Wu; Dawei Wang; Ruonan Zhang; Daosen Zhai

A Secure Transmission Scheme Based on Efficient Transmission Fountain Code
Le Chai; Pinyi Ren; Qinghe Du

Precoding and Destination-aided Cooperative Jamming in MIMO Untrusted Relay Systems
Luyuan Zhang; Hang Long; Li Huang

Impact of Cooperative Attack on User Scheduling in Massive MIMO Systems
Shaodi Wang; Hui-Ming Wang

Design and Implementation of a 5G NR-based Link-adaptive System
Jichao Wang; Yu Han; Xiao Li; Shi Jin

Semantic Fusion Infrastructure for Unmanned Vehicle System Based on Cooperative 5G MEC
Yongxing Lian; Liang Qian; Lianghui Ding; Feng Yang

Cooperative Computation Offloading in NOMA-Based Edge Computing

Fusheng Zhu; Yuwen Huang; Yuan Liu; Xiuyin Zhang

Edge Intelligence-Based Joint Caching and Transmission for QoE-Aware Video Streaming
Peng Lin; Qingyang Song; Jing Song; Lei Guo; Abbas Jamalipour

Privacy-Aware Task Offloading via Two-Timescale Reinforcement Learning
JiYu Dong; Dongqing Geng; Xiaofan He

Virtual Room 9

Time: 15:10pm-16:40pm, 10 Aug. 2020

SAC-02: Learning-based Schemes

SESSION CHAIR: Hongquang Sun

Invited Paper: The Design-for-Cost of millimeter-wave Front-End for 5G and Beyond
Jianguo Ma

Deep Learning based Millimeter Wave Beam Tracking at Mobile User: Design and Experiment
Pengbo Si; Yu Han; Shi Jin

A Low Complexity Dispersion Matrix Optimization Scheme for Space-Time Shift Keying
Yun Wu; Wenming Han; Xueqin Jiang; Bai Enjian; Miaowen Wen; Jian Wang

Deep Learning Based Active User Detection for Uplink Grant-Free Access
Jiaqi Fang; Yining Li; Changrong Yang; Wenjin Wang; Xiqi Gao

An Enhanced Handover Scheme for Cellular-Connected UAVs
Wenbin Dong; Xinhong Mao; Ronghui Hou; Xixiang Lv; Hui Li

Virtual Room 9

Time: 16:50pm-18:20pm, 10 Aug. 2020

SAC-03: Learning

SESSION CHAIR: Junyu Liu

Computation Resource Allocation in Mobile Blockchain-enabled Edge Computing Networks
Yiping Zuo; Shengli Zhang; Yu Han; Shi Jin

Collaborative Anomaly Detection for Internet of Things based on Federated Learning
Seongwoo Kim; He Cai; Cunqing Hua; Pengwenlong Gu; Wenchao Xu; Jeonghyeok Park

Super-resolution Electromagnetic Vortex SAR Imaging Based on Compressed Sensing

Yanzhi Zeng; Yang Wang; Chenhong Zhou; Jian Cui; Jinghan Yi; Jie Zhang

Performance and Cost of Upstream Resource Allocation for Inter-Edge-Datacenter Bulk Transfers
Xiao Lin; Junyi Shao; Ruiyun Liu; Weiqiang Sun; Weisheng Hu

A Modification of UCT Algorithm for WTN-EinStein würfelt nicht! Game
Xiali Li; Yingying Cai; Luyao Yu; Licheng Wu; Xiaojun Bi; Yue Zhao; Bo Liu

Virtual Room 1

Time: 10:30am -12:00pm, 11 Aug. 2020

CT-02: Information Freshness and Codes

SESSION CHAIR: Xijun Wang, He Chen

Closed-form Analysis of Age of Information in Energy Harvesting Network
Siyu Wang; Xin Wang; Tianyi Peng; Jiaxi Zhou; Qi Qin; Xijun Wang

Age-Optimal UAV Trajectory Planning for Information Gathering with Energy Constraints
Xiangjin Zeng; Feipeng Ma; Tingwei Chen; Xuanzhang Chen; Xijun Wang

Cluster-Based Cooperative Digital Over-the-Air Aggregation for Wireless Federated Edge Learning
Ruichen Jiang; Sheng Zhou

Optimizing Information Freshness in Two-Way Relay Networks
Bohai Li; He Chen; Nikolaos Pappas; Yonghui Li

UEP Online Fountain Codes with Sequential Window Strategy
Yifan Duan; Lianghui Ding; Feng Yang; Liang Qian; Cheng Zhi

Virtual Room 1

Time: 13:30pm -15:00pm, 11 Aug. 2020

CT-03: Communication Security

SESSION CHAIR: Haowei Wu, Qiuna Niu

High Precision Indoor Positioning Method with Less Fingerprints Collection on 60GHz
Qiuna Niu; Hongping Li; Shi Wei

Achieving One-Time Pad via Endogenous Secret Keys in Wireless Communication
Liang Jin; Xu Wang; Yangming Lou; Xiaoming Xu

Achievable Rate of Multi-Antenna WSRNs with EH Constraint in the Presence of a Jammer

Minhan Tian; Wangmei Guo; Guiguo Feng; Jingliang Gao

A Decode-and-Forward Relay-Aided Proactive Eavesdropping Scheme for Wireless Surveillance

Haowei Wu; Lian Yan; Rui Ma; Jinglan Ou; Jingyue Cui

Secrecy Rate Maximization in Millimeter Wave SWIPT Systems based on Non-Linear Energy Harvesting

Gangcan Sun; Mengyuan Ma; Zhengyu Zhu; Jinlei Xu; Wanming Hao

Virtual Room 1

Time: 15:10pm -16:40pm, 11 Aug. 2020

CT-04: Resource Allocation

SESSION CHAIR: Junhui Qian, Yunjian Jia

Radio Resource Allocation for RAN Slicing in Mobile Networks

Liushan Zhou; Tiankui Zhang; Jing Li; Yutao Zhu

Communication and Computation Resource Allocation for End-to-End Slicing in Mobile Networks

Zhou Tong; Tiankui Zhang; Yutao Zhu; Rong Huang

Robust Design for Signal Mismatch With Steering Vector and Covariance Matrix Constraints

Junhui Qian; Shuya Zhang; Mengchen Lu; Fengchun Tian

Time-frequency Overlapped Signals Intelligent Modulation Recognition in Underlay CRN

Huaiyu Tang; Mingqian Liu; Liwei Chen; Jianying Li; Jian Chen

Joint Optimization of Wireless Resource Allocation and Task Partition for Mobile Edge Computing

Zhuo Yang; Jinfeng Xie; Jie Gao; Zhixiong Chen; Yunjian Jia

Virtual Room 2

Time: 10:30am -12:00pm, 11 Aug. 2020

WCS-07: Advanced Wireless Techniques I

SESSION CHAIR: Fan Jiang, Keping Yu

Blocking- and Delay-aware Flow Control Using Markov Decision Process

Yixuan Wang; Changyin Sun; Fan Jiang; Jing Jiang

Energy Consumption Minimization using Data Compression in Mobile Edge Computing

Bo Wang; Yaqiong Liu; Guochu Shou; Yihong Hu

Multiuser Offloading Strategy Based on User's Computing Ability in Massive MIMO System

Xinyu Gong

Timing Advance Estimation with Robustness to Frequency Offset in Satellite Mobile Communications

Li Zhen; Keping Yu; Guangyue Lu; Yukun Zhang

Joint Power Allocation for a Novel Positioning-communication Integrated Signal

Lu Yin; Jiameng Cao; Tianrun Jiang; Zhongliang Deng

Virtual Room 2

Time: 13:30pm -15:00pm, 11 Aug. 2020

WCS-08: Advanced Wireless Techniques II

SESSION CHAIR: Yunjian Jia, Zhongyuan Zhao

On the Node Energy Efficiency of Full Duplex Two-way Ultra-Reliable Short Packet Communications

Zhihao Ye; Zhengchuan Chen; Yunjian Jia; Liang Liang; Min Wang

A Unified Framework for Communications, Computing and Caching Resources Allocation in Mobile Networks

Yingjiao Li; Yaping Sun; Zhiyong Chen; Meixia Tao; Wenjun Zhang

PAPR Suppressing Discrete Fourier Transform Precoding-based DSSS-GFDM Transceiver for 5G Satellite Communications

Huanyu Liu; Yuan Jiang; Lin Zhang

Analysis of UWB Antenna with the MoM Based on RWG-SWG Hybrid Basis Function

Huaijun Zhou; Wei Liu

Particle Swarm Optimization Algorithm based Multi-Path Channel Model Simplification

Mingwei Tang; Hang Long; Yixiao Li

Virtual Room 2

Time: 15:10pm-16:40pm, 11 Aug. 2020

WCS-09: Advanced Wireless Techniques III

SESSION CHAIR: Nan Wu, Bin Xia

A Parallel Carrier Recovery Scheme for an 8Gbps Terahertz Communication System

Yuli Wang; Zhen Qin; Yunsi Ma; Yuanjing Qi; Nan Wu

Sparse Code Multiple Access with Index Modulation
Chen Zuo; Jianping Zheng

Time-reversal ESD for Direction of Arrival Estimation over Multipath channels
Jiawen Lu

Performance Analysis for Full-Duplex Networks with Interference Cancellation and Retransmission
Pengcheng Liu; Bin Li; Yixiao Gu; Bin Xia

Outage Performance of Power Beacon-Assisted Cooperative Hybrid Decode-Amplify-Forward Relaying Wireless Communications
Xinyu Wu; Lu Tang; Jing Yang

Virtual Room 3

Time: 10:30am-12:00pm, 11 Aug. 2020

WCS-10: Advanced Wireless Techniques IV
SESSION CHAIR: Wensheng Zhang, Jie Yang

Comparison of OFDM and SC-FDE for VLC Systems with a Nonlinear LED Model
Hao Zhang; Jian Sun; Wensheng Zhang; Zhiquan Bai; Cheng-Xiang Wang

Transmission Diversity Schemes for Downlink Control Channel in 5G
Qin Mu; Yuqiang Chen; Kexin Xiong; Chenxi Liu

Delay-Aware Energy Minimization Offloading Scheme for Mobile Edge Computing
Fan Jiang; Fengmiao Wei; Junxuan Wang; Xinying Liu

An Interference Suppression Method Based on Space-Eigen Adaptive Processing for Satellite Communications
Mengyun Zhao; Hongzhi Zhao; Wenbo Guo; Youxi Tang

Cost-Oriented Cooperative Caching Scheme in Energy-Harvesting-Powered Ultra-Dense Networks
Jing Song; Peng Lin; Qingyang Song; Lei Guo

Virtual Room 3

Time: 13:30pm-15:00pm, 11 Aug. 2020

WCS-11: Advanced Wireless Techniques V
SESSION CHAIR: Yue Xiu, Hong Wang

Extended SCMA Graphs for Block Fading Channels
Shannan Mou; Jincheng Dai; Zhongwei Si

A Fast Beam Training Method for 5G New Radio
Lei Wang; Bo Ai; Yong Niu; Zhangdui Zhong; Qi Wang; Zhu Han

Recovering Missing Values from Corrupted Historical Spectrum Observations for Dependable Spectrum Prediction
Xi Li; Zhicheng Liu; Yinfei Xu; Xin Wang; Tiecheng Song

Outage Performance Analysis of Full-Correlated Rayleigh MIMO Channels
Huan Zhang; Guanghua Yang; Zheng Shi; Shaodan Ma; Hong Wang

Virtual Room 3

Time: 15:10pm-16:40pm, 11 Aug. 2020

WCS-12: Advanced Wireless Techniques VI
SESSION CHAIR: Hao Huang, Ning Zhang

An Intellectual Routing Algorithm based on SDN
Qingwen Han; Sheng Cheng; Lingqiu Zeng

Power Efficient Finite-Block Length Transmission over Parallel Fading Channels with Statistical QoS Guarantee
Hongsen Peng; Meixia Tao

Multiuser AF MIMO Multi-Relay System Design with Direct Links and MMSE-DFE Receiver
Yang Lv; Zhiqiang He; Yue Rong

Multiuser Scheduling for Minimizing Age of Information in Uplink MIMO Systems
He Chen; Qian Wang; Zheng Dong; Ning Zhang

Virtual Room 4

Time: 10:30am -12:00pm, 11 Aug. 2020

MWN-04: UAV
SESSION CHAIR: Chungang Yang, Gaofeng Nie

Coordinated Transmission on the Ocean for Cell-Free Satellite-U`AV-Terrestrial Networks
Wei Feng

Joint Access and Backhaul Link Optimization in Multiple UAV-Assisted Emergency Network
Xiaoxu Yuan; Hui Tian; Gaofeng Nie

Flying LTE for UAV Dynamic Access Control
Xiafei Bu; Chungang Yang

A Mobility Aware Clustering Scheme Based on Swarm Intelligence in FANETs
Min Wang

Sum Rate Maximization for UAV-Enabled Wireless Powered NOMA Systems
Jin Du; Zhengqiang Wang; Zifu Fan; Xiaoyu Wan

Performance Analysis of the Coexistence of 5G NR-Unlicensed and Wi-Fi with Mode Selection
Yifan Jiang; Jing Guo; Zesong Fei

Adaptive Fast Simplified Successive Cancellation List Polar Decoding based on Path Selecting
Ling Wang

Statistical QoS Provisioning Resource Allocation Over SWIPT Based Relay Networks Optimal Power Allocation with a Cooperative Relay in Multi-point WBAN
Ya Gao; Yongpeng Shi; Yujie Xia; Hailin Zhang

A Deep Reinforcement Learning-Based Caching Strategy for Internet of Things
Ali Nasehzadeh; Ping Wang

Maximizing Lifetime of Delay-Tolerant Sensor Networks with a Mobile Sink
Yi Chen; Kenneth W. Haoliang Li; Peiliang Zuo; Hanbo Jing; Wenbo Wang

Secure Routing Based on Geographic Location for Resisting Blackhole Attack in Three-dimensional VANETs
Jingxuan Lyu; Chenju Chen; Hui Tian

Adaptive Relay Selection with Physical Layer Security for Green Communications
Yanjun Yao

Improving the Security of Wireless Network from Software Perspective
Xiaoxue Wu; Weiqiang Fu; Dejun Mu; Deming Mao; Hui Zhang; Wei Zheng

Secrecy Performance Analysis in Internet of Satellites: Physical Layer Security Perspective
Yongpeng Shi; Ya Gao; Yujie Xia

Beam Management for Cellular-Connected UAVs: A Fast Link Recovery Approach
Jinli Wu; Xinhong Mao; Ronghui Hou; Xixiang Lv; Hui Li

Improved Method of Deblocking Filter Based on Convolutional Neural Network in VVC
Jing Yang; Biao Du; Tong Tang

Receiver Assisted LBT Mechanism Design for Beam-based Transmission in Unlicensed Bands
Wenxin Wang; Ming Zeng; Zesong Fei

An Almost Blank Subframe Allocation Algorithm for 5G New Radio in Unlicensed Bands
Qingqing Tang; Ming Zeng; Jing Guo; Zesong Fei

Research and Evaluation on Beam Scheduling Algorithm based on Hybrid Beamforming in Millimeter Wave
Hui Liu; Jiamo Jiang; Xia Shen; Jiahui Li

A Cooperative Coded Caching Strategy for D2D-Enabled Cellular Networks
Yunpeng Ma; Weijing Qi; Peng Lin; Mengru Wu; Lei Guo

User Preference and Activity Aware Content Sharing in Wireless D2D Caching Networks
Yulong Qi; Jingjing Luo; Lin Gao; Fu-Chun Zheng; Li Yu

IoT Gateway Association and Data Scheduling for Delay Optimization in LEO Satellite Systems
Chong Liu; Rong Chai; Qianbin Chen

Cooperative mechanism of entity state information search with trajectory prediction
Puning Zhang; Xuefang Li; Xuyuan Kang

Physical Layer Secret Key Generation Based on Autoencoder for Weakly Correlated Channels
JingYuan Han; Xin Zeng; Xiaoping Xue; Jingxiao Ma

Secrecy Rate Maximization for Intelligent Reflecting Surface Aided SWIPT Systems
Wei Sun; Qingyang Song; Lei Guo; Jun Zhao

Proactive Eavesdropping Scheme via Decode-and-Forward Relay with Multiple Full-Duplex Antennas

Lisheng Yang; Jingyue Cui; Rui Ma; Haowei Wu; Jinglan Ou

Dual-antenna Time-delay Countermeasure Against Passive Location System

Shiqi Zhang; Pinyi Ren; Qinghe Du

Secure Transmission in FDD MBM Systems Using Analog Feedback

Xiaomeng Zhou; Zhenzhen Gao; Xuewen Liao

Virtual Room 6

Time: 10:30am-12:00pm, 11 Aug. 2020

SPC-04: Localization

SESSION CHAIR: Dian Fan,Feifei Gao

An Enhanced Indoor Localization System Using Crowdsourced Multi-Source Measurements

Biheng Yang; Bin Li; Lyuxiao Yang; Nan Wu

DOA Estimation for Arbitrarily Distributed Subarrays in UAV Swarm

Dian Fan; Gan Guo; Jiaming Song; Lanfei Li; Yue Zhu

Positioning with Dual Reconfigurable Intelligent Surfaces in Millimeter-Wave MIMO Systems

Jingwen Zhang; Zhong Zheng; Zesong Fei; Xuyan Bao

Three-Dimensional Localization of RF Emitters: A Semantic Segmentation-based Image Processing Approach

Huichao Chen; Zheng Wang; Wei Wang; Guoru Ding

CSI-based Indoor Localization Error Bound Considering Pedestrian Motion

Zhenya Zhang; Liangbo Xie; Mu Zhou; Yong Wang

Virtual Room 6

Time: 13:30pm -15:00pm, 11 Aug. 2020

SPC-05: Coding and Decoding

SESSION CHAIR: Sheng Wu, Feifei Gao

Probabilistic Shaping Combined With Spatially - Coupled LDPC Code in FTN System

Jiali Xie; Sheng Wu; Yizhen Jia

A Low Complexity Successive Cancellation List Decoding Algorithm of Polar Codes

Jiansong Miao; Weijie Li; Xuejia Hu; Hairui Li

A Parallel and Memory-Efficient Decoding for Spatially-Coupled LDPC Codes

Qihao Wu; Lihong Lv; Yanjun Yao; Sheng Wu

Modulation Classification in Successive Relaying Systems with Interference

Tao Li; Wei Liu; Xiaoyu Jiang; Yongzhao Li

Enabling Joint Tx-Rx Spatial Modulation with RF Mirrors

Chaowen Liu; Yihua Dong; Boyang Liu; Guangyue Lu; Pengyu Zhai

Virtual Room 6

Time: 15:10pm-16:40pm, 11 Aug. 2020

CIS-05: Attack Detection

SESSION CHAIR: Huici Wu, Yilong Hui

Multi-Attacker Multi-Defender Interaction in mMTC Networks Via Differential Game

Qiuyue Gao; Huici Wu; Jiazhen Zhang; Yunfei Zhang; Ning Zhang; Xiaofeng Tao

Relay-Aided Proactive Eavesdropping with Learning-Based Power and Location Optimization

Rui Ma; Haowei Wu; Jinglan Ou; Zhengchuan Chen; Qihao Peng

Delay-aware Secure Transmission in MEC-enabled Multicast Network

Qian Xu; Pinyi Ren

A Fast Method to Attack Real-time Object Detection Systems

Yiwei Li; Guoliang Xu; Wanlin Li

Distributed Denial of Service Defense in Software Defined Network Using OpenFlow

Pengfei Zhai; Chungang Yang

Virtual Room 7

Time: 10:30am -12:00pm, 11 Aug. 2020

IoT-04: Resource Allocation

SESSION CHAIR: Qing Wei, Hanlin Mou

Dynamic Task Offloading and Resource Allocation for Heterogeneous MEC-enable IoT

Shichao Xia; Xingxing Wen; Zhixiu Yao; Yun Li

Hypergraph Based Resource Allocation and Interference Management for Multi-Platoon in Vehicular Networks

Hewen Cui; Lianming Xu; Qing Wei; Li Wang

A Prediction-Based Spectrum Allocation Scheme for Two-Layer Cellular Vehicular Networks

Qian Li; Weijing Qi; Lei Guo

Mobility Improves the Performance of Collaborated Spectrum Sensing
Huijun Xing; Zheng Dezhi; Wang Shuai

Multi-user Cooperative Spectrum Sensing Based on the Mean Value of Cumulative Power
Yufei Dai; Liang Liu; Dongfang Hu; Han Yang

A Novel Virtual Small Cell-Based Group-Paging Scheme for Massive MTCs over LTE Networks
Linh T. Hoang; Anh-Tuan Hoang Bui; Chuyen T. Nguyen; Anh T. Pham

Preamble Split Transmission and Joint Active User Detection for Massive Connectivity
Lin jie Yang; Pingzhi Fan; Li Li; Li Hao

Maximum Sum Rate of Slotted Aloha for mMTC with Short Packet
Weihua Liu; Xinghua Sun; Wen Zhan; Xijun Wang

An Incentive Mechanism for Nondeterministic Vehicular Crowdsensing with Blockchain
Fan Li; Changle Li; Yuchuan Fu; Pincan Zhao

User Scheduling for Information Freshness over Correlated Markov Channels
Yanzhi Huang; Xijun Wang; Xinghua Sun; Xiang Chen

Indoor CSI Fingerprint Localization Based on Tensor Decomposition
Yuexin Long; Liang Bo Xie; Mu Zhou; Yong Wang

A Novel Cost-Effective IoT-Based Traffic Flow Detection Scheme for Smart Roads
Zhao Liu; Changle Li; Hui Wang; Yunpeng Wang; Yilong Hui; Guoqiang Mao

Basketball Footwork Recognition using Smart Insoles Integrated with Multiple Sensors
Min Peng; Zhong Zhang; Qingfeng Zhou

A Dynamic Continuous Hand Gesture Detection and Recognition Method with FMCW Radar
Aihu Ren; Yong Wang; Xiaobo Yang; Mu Zhou

Intelligent Emotion Detection Method in Mobile Edge Computing Networks

Zhidu Li; Ji Lv; Dapeng Wu

A Distributed Reinforcement Learning Approach to In-network Congestion Control
Tianle Mai; Haipeng Yao; Xing Zhang; Zehui Xiong; Dusit Niyato

Distributed Computation Offloading using Deep Reinforcement Learning in Internet of Vehicles
Chen Chen; Zheng Wang; Qingqi Pei

Towards Mitigating Straggler with Deep Reinforcement Learning in Parameter Server
Haodong Lu; Kun Wang

Deep Reinforcement Learning Based Task Scheduling in Edge Computing Networks
Qi Fan; Zhuo Li; Xin Chen

AoI-driven Fresh Situation Awareness by UAV Swarm: Collaborative DRL-based Energy-Efficient Trajectory Control and Data Processing
Wen Fan; Ke Luo; Shuai Yu; Zhi Zhou; Xu Chen

Adaptive Learning-Based Multi-Vehicle Task Offloading
Hao Qin; Guoping Tan; Siyuan Zhou; Yong Ren

WorkerFirst: Worker-Centric Model Selection for Federated Learning in Mobile Edge Computing
Huawei Huang; Yang Yang

Network Cost Optimization-based Controller Deployment for SDN
Chunling Du; Jinyan Li; Lei Zhang; Qianbin Chen

Double Attention-based Deformable Convolutional Network for Recommendation
Honglong Chen; Zhe Li; Kai Lin; Vladimir V. Shakhov; Leyi Shi