

Special Interest Groups (SIG) on Social Behaviour Driven Cognitive Radio Networks

Prof. Li Wang

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Beijing university of Posts and telecommunications

LinkedIn ID: <https://www.linkedin.com/groups/13553118>

IEEE ComSoc SIG on Social Behaviour Driven
Cognitive Radio Networks

Outline

- 1 **Background and Motivations**
- 2 Members of Our SIG
- 3 Finished Activities
- 4 Ongoing Activities

Overview: Social Behaviour Driven Cognitive Radio Networks

➤ Scope and Objectives

- Interplay between Social science and Wireless Communications
 - Application Driven Networks: AI & Machine learning
 - Social behaviours of mobile users trigger more social platforms and applications
 - Smart applications affect social behaviors of mobile users as well
- Exploiting social behaviors for cognitive radio and networks
- Improve spectrum utilization and provide more flexibility in networking

➤ Critical technical problems

- How to efficiently formulate and utilize human-device interactions to boost communication performance since the device holder are supposed to be mobile regularly?
- How to facilitate the benefits of considering social behaviours and application characteristics from utilizing the devices' capability of caching and computing?
- How to sense and understand social behaviours and more diverse applications characteristics?
-

Goal: Provide a platform on the development of social behaviour driven CRNs to exploit and explore new dimensions.

Schedule for Our SIG

➤ Workshops

- SPAWC 2018, GLOBECOM 2018, ICC 2019, and GLOBECOM 2019, etc.

➤ Special Issues

- IEEE JSAC, Trans. on Communications, Trans. on Wireless Communications, Trans. on Service Computing, Trans. on Information Theory, Trans. On Networking, Communication Mag., Signal Processing Mag., IEEE Access, etc.
 - The **first SI** on IEEE Access before **Jan. of 2018**;
 - **Two SIs** on IEEE Transactions on Cognitive Communications and Networks, IEEE Wireless Communications, or IEEE JSAC before **August 2018**, and at the **beginning of 2019**, respectively.

➤ Organizing regular meetings

- During special sessions at related conferences (INFOCOM, ICC, GLOBECOM, etc.), on the personal web pages of the SIG organizers
- Through an email distribution list of potential members.

➤ Invited talks

- The possible candidates are Professors listed as follows
 - Prof. Hanzo Lajos at University of Southampton;
 - Prof. Jie Wu at Temple University;
 - Prof. Vincent Lau at Hong Kong University of Science and Technology;
 - Prof. Kwang-Cheng Chen at University of South Florida;
 - Prof. Zhu Han at University of Houston.

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- 2 **Members of Our SIG**
- 3 Finished Activities
- 4 Ongoing Activities

Members of SIG

➤ Chair:

- Dr. Li Wang, Professor, liwang@bupt.edu.cn
- Beijing University of Posts and Telecommunications (BUPT), China



➤ Vice-Chair



- Giuseppe Araniti
University Mediterranea of
Reggio Calabria, Italy
araniti@unirc.it

- Trung Q. Duong(PhD Sep. 2012)
Queen's Uni. Belfast, UK
trung.q.duong@gmail.com



- Bo Bai
Future Network Theory Lab,
2012 Labs, Huawei Technologies
Co., Ltd., HongKong
ee.bobbai@gmail.com ;
baibo8@huawei.com

- Yongpeng Wu
Shanghai Jiaotong University,
China
yongpeng.wu@sjtu.edu.cn



➤ Secretary

- Yinan Ding (Phd.)
Beijing university of Posts and Telecommunications
dingyinan@bupt.edu.cn



Members of SIG

➤ **Chair:** Prof. Li Wang, liwang@bupt.edu.cn
Beijing university of Posts and Telecommunications, BUPT, China

➤ **Research Interests:**

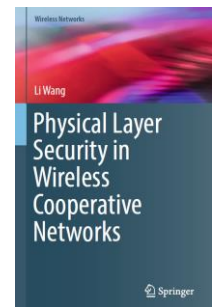
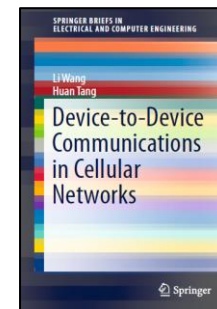
- Wireless communications
- Cognitive radio and networks
- Physical layer security
- Distributed storage systems
- Device-to-device communications
- Social networking

➤ **Professional Activities:**

- Published 3 books and 1 book chapter, and more than 80 journal and conference papers, as well as more than 40 patents
- Editor for IEEE Transactions on Vehicular Technology
- Associate Editor for IEEE Access and lead guest editor for several SIs
- Symposium co-chair of IEEE ICC 2019 on Cognitive Radio and Networks Symposium
- Co-chair of Special session on Signal Processing and Networking for IoT
- Invited Speaker for IEEE IECON 2017
- Serving as TPC members of several IEEE conferences, e.g., IEEE GLOBECOM, ICC, WCNC.

➤ **Awards:**

- The 2018 Beijing New-star of Science and Technologies
- **Best paper** award of ICC 2017
- **Best paper** runner up of WASA 2015
- The 2013 Beijing Young Elite Faculty for Higher Education Award
- **Best paper** award of ICCTA 2011
- ...



➤ Vice-Chair



Giuseppe Araniti
University Mediterranea of Reggio Calabria, Italy
araniti@unirc.it

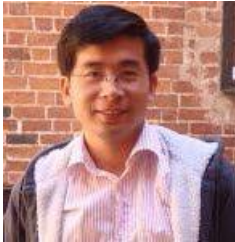
➤ Research Interests

- Wireless and mobile 5G communication networks
- Machine type Communications
- Device-to-Device communications
- Radio resource management
- Multicast/Broadcast services
- IoT and Nb-IoT communications

➤ Professional Activities

- Assistant professor at University Mediterranea of Reggio Calabria
- Chief Researcher at RUDN University
- Associate Editor for IEEE Access and Guest Editor for several Special Issues
- Vice-Chair IEEE BTS Italy chapter
- Conference Technical Program Co-Chair IEEE BMSB'17
- Serving as TPC members of several IEEE conferences, including IEEE GLOBECOM, ICC, INFOCOM, PIMRC, etc.
- Published more than 140 scientific papers including IEEE international journals and conferences, book chapters and tutorial.
- Best Paper Award at IEEE BMSB'17, IEEE ICUM'15, SPACOMM'09
- Co-funder of University Spin-off (SMARTS srl) operating mainly in the field of quality of service (QoS) and quality of experience (QoE) testing for mobile 4G/5G networks.

➤ Vice-Chair



Trung Q. Duong (PhD Sep. 2012)

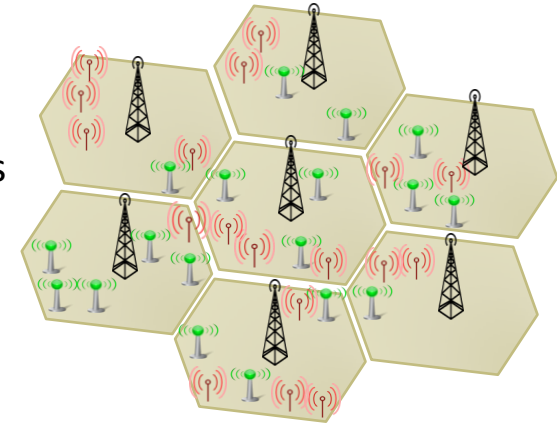
Queen's Uni. Belfast, UK

trung.q.duong@gmail.com

Assistant Prof. in Signal Processing for Communications

➤ Research Interests

- ✓ Applied mathematics, e.g., stochastic geometry, random process, game theory, optimization, in analyzing, modelling and optimizing the performance of networks:
 - 5G technologies: physical layer security, HetNets, small-cell, massive MIMO, mm-wave, ultra-dense cellular networks, energy harvesting communications
 - Disaster communications, molecular communications, smart grid



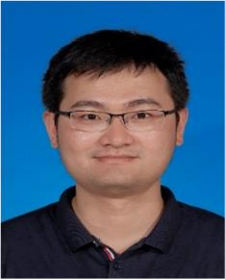
Secured and Energy-Efficient Small-Cell Networks

➤ Professional Activities and Awards

- Published 151 journals (including 113 IEEE Journals) and 130 conference papers.
- Secured research grants £2.5 million (£2 million as Principle Investigator and £0.5 million as Co-I) over the last 3 years
- Acting as Editor for major journals (IEEE Trans on Communications and IEEE Trans on Wireless Communications)
- Lead Senior Editor for IEEE Communications Letters
- Symposium Chair for Signal Processing for Communications of IEEE GLOBECOM 2016
- Acting as Guest Editor for 15 special issues (IEEE JSAC, IEEE Commun. Magazine, IEEE Wireless Commun., IET Communications, IEEE Access)
- Best Paper Award at IEEE DSP 2017, IEEE GLOBECOM 2016, IEEE ICC 2014 and IEEE VTC 2013
- Royal Academy of Engineering Research Fellowship (2016 – 2021)
- Newton Prize 2017

Members of SIG

➤ Vice-Chair



Yongpeng Wu
Shanghai Jiaotong University, China
yongpeng.wu@sjtu.edu.cn

➤ Research Interests

- Massive MIMO/MIMO systems;
- Physical layer security;
- Signal processing for wireless communications;
- Multivariate statistical theory.

➤ Professional Activities

- An Exemplary Reviewer of the IEEE Transactions on Communications in 2015, 2016;
- The lead guest editor for the special issue "Physical Layer Security for 5G Wireless Networks" of the IEEE JSAC;
- Editor of the IEEE Access and IEEE Communications Letters;
- TPC member of IEEE Globecom, ICC, VTC, and PIMRC, etc;
- ...

➤ Awards

- Awarded the IEEE Student Travel Grants for IEEE (ICC) 2010;
- The Alexander von Humboldt Fellowship in 2014;
- The Travel Grants for IEEE Communication Theory Workshop 2016;
- The Excellent Doctoral Thesis Awards of China Communications Society 2016.

Senior Advisors



Prof. Lajos Hanzo, University of Southampton (Communications)

- IEEE fellow and IEE/IET fellow;
- Fellow of the [Royal Academy](#) of Engineering (FREng);
- A Governor of the IEEE VTS as well as of ComSoc;
- The Editor-in-Chief of the [IEEE Press](#);
- An IEEE Distinguished Lecturer of both the [Communications Society](#) and the [Vehicular Society](#) .
- The Honorary Doctorate “Doctor Honoris Causa”.
- The Doctor of Sciences (DSc) degree



Prof. Jie Wu, Temple University (Networking)

- IEEE fellow
- Director, International Affairs, College of Science and Technology (CST)
- Director, Center of Networked Computing, CST
- Laura H. Carnell Professor, Department of Computer and Information Sciences (CIS)
- A CCF Distinguished Speaker
- China Computer Federation (CCF) Overseas Outstanding Achievement Award



Prof. Zhu Han, University of Houston (Artificial Intelligence)

- IEEE fellow
- IEEE Distinguished Lecturer
- An NSF Career Award in 2010,
- The Fred W. Ellersick Prize of the IEEE Communication Society in 2011
- The EURASIP Best Paper Award for the Journal on Advances in Signal Processing in 2015
- IEEE Leonard G. Abraham Prize in the field of Communications Systems (best paper award in IEEE JSAC) in 2016, and several best paper awards in IEEE conferences

Founding Members

- Tommy Svensson, Chalmers University of Technology, tommy.svensson@chalmers.se
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- George K. Karagiannidis, Aristotle University of Thessaloniki, Greece, geokarag@auth.gr
- Le-Nam Tran, University College Dublin, Ireland, nam.tran@ucd.ie



Academic



Industries



Outline

- 1 Background and Motivations
- 2 Members of Our SIG
- 3 **Finished Activities**
- 4 Ongoing Activities

Finished activities

➤ Finished Activities---6 items

- Special Issue: IEEE ACCESS
- Special Issue: IEEE JSAC
- Special Issue: IEEE Com. Mag.
- IEEE SPAWC 2017
- IEEE INFOCOM 2018 Workshop
- International School on 5G Systems

IEEE Access®

IEEE JOURNAL ON
**SELECTED AREAS IN
COMMUNICATIONS**

IEEE
COMMUNICATIONS
MAGAZINE

SPAWC 2017

IEEE INFOCOM 

INTERNATIONAL SCHOOL
Enabling Technologies, Applications,
and Methods for Emerging 5G Systems

IEEE Access[®]

Multidisciplinary : Rapid Review : Open Access Journal

IF: 3.244



Associate Editor: Li Wang, Beijing University of Posts and Telecommunications, China

Guest Editors:

1. Giuseppe Araniti, University Mediterranea of Reggio Calabria, Italy
2. Yong Li, Tsinghua University, China
3. Tommy Svensson, Chalmers University of Technology, Sweden
4. Zhu Han, University of Houston, USA



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<http://www.ieee.org/ieee-access>



➤ **Topics of interest include:**

- Modelling of social behaviors and interactions toward efficient networking and/or computing
- Economy for social-aware networking and computing
- Socially enabled resource allocation in wireless networks
- Game theoretic formulation for networking and/or computing of interacting entities
- Socially-enhanced wireless networking technologies such as device-to-device (D2D) communications, Internet of Things (IoT), vehicular networks, LTE-U, and network virtualization
- Socially enabled mobile computing frameworks, algorithms and experiments
- Mobile cloud computing assisted by socially enabled techniques, such as offloading and caching
- Social-aware content sharing and distributed storage in mobile communications
- Privacy, trust and security for socially enabled networking and computing
- Mobile social networking systems and prototypes

<http://ieeaccess.ieee.org/special-sections-closed/socially-enabled-networking-computing/>

➤ IEEE JSAC:

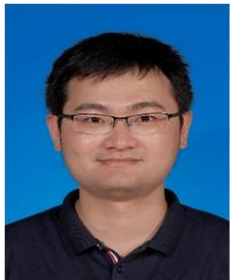
- ✓ **Special Issue** on “Physical Layer Security for 5G Wireless Networks”

➤ Guest Editors

- ✓ Yongpeng Wu (Lead)
 - Technical University of Munich
 - yongpeng.wu2016@gmail.com
- ✓ Ashish Khisti
 - University of Toronto
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- ✓ Chengshan Xiao
 - Missouri University of Science and Technology
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- ✓ Giuseppe Caire
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- ✓ Kai-Kit Wong
 - University College London
 - kai-kit.wong@ucl.ac.uk
- ✓ Xiqi Gao
 - Southeast University
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IEEE JOURNAL ON SELECTED AREAS IN COMMUNICATIONS

IF: 8.085

HOME » IEEE JOURNAL ON SELECTED AREAS IN COMMUNICATIONS HOME » CALL FOR PAPERS » PHYSICAL LAYER SECURITY FOR 5G WIRELESS NETWORKS

PHYSICAL LAYER SECURITY FOR 5G WIRELESS NETWORKS

➤ Research Interests:

- Fundamental aspects of physical layer security in 5G systems
- Security threats and countermeasures for massive MIMO technology
- Secure transmission in heterogeneous networks
- Security for millimeter wave communications
- Security for full duplex communications
- Security provisioning in NOMA
- Cross-layer design for secure communications
- Practical test beds for physical layer security

<https://www.comsoc.org/jsac/cfp/physical-layer-security-5g-wireless-networks>

IEEE COMMUNICATIONS MAGAZINE

IF: 10.435

HOME » IEEE COMMUNICATIONS MAGAZINE HOME » CALL FOR PAPERS » MULTI-ACCESS MOBILE EDGE COMPUTING FOR HETEROGENEOUS IOT

MULTI-ACCESS MOBILE EDGE COMPUTING FOR HETEROGENEOUS IOT

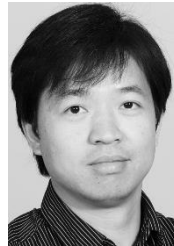
GUEST EDITORS

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Email: alberto.leongarcia@utoronto.ca



Usman Javaid

Vodafone, UK

Email: usman.javaid@vodafone.com



<http://www.comsoc.org/commag/cfp/multi-access-mobile-edge-computing-heterogeneous-iot>

Topics

- Fundamental design issues in MA-MEC
 - Radio resource management for MA-MEC
 - Task scheduling and computation resource management for MA-MEC
 - Virtualization and network slicing for MA-MEC
 - Location and sizing of computation and storage elements for MA-MEC
 - Communication protocols and network architectures for MA-MEC
 - Security, privacy, and reliability in MA-MEC
 - QoE and QoS provisioning in MA-MEC
 - 5G/LTE/WiFi enabled MA-MEC
 - Energy management and green MA-MEC
 - Edge-to-cloud integration and protocols for MA-MEC
 - Human and social-driven design of MA-MEC
- MA-MEC for Heterogeneous IoT
 - MA-MEC for smart cities
 - MA-MEC for video/audio surveillance
 - MA-MEC for industrial IoT
 - MA-MEC for smart energy systems
 - MA-MEC for smart healthcare
 - MA-MEC for intelligent transportation systems
 - MA-MEC for big data analytics



Special Session 15: [Signal Processing and Networking for Internet-of-Things](#)

Organizer: **Prof. Kwang-Cheng Chen**, *University of South Florida, USA*

Prof. Li Wang, *Beijing University of Posts and Telecommunications, China*

Contributors: **Prof. Zhiyong Feng**, *Beijing University of Posts and Telecommunications, China*

Prof. Qihui Wu, *Nanjing University of Aeronautics and Astronautics, China*

Prof. Hongbo Zhu, *Nanjing University of Posts and Telecommunications, China*

Prof. Qimei Cui, *Beijing University of Posts and Telecommunications, China*

Prof. Kwang-cheng Chen, *University of South Florida, USA*



Organizer:



IEEE
Signal Processing Society



HOKKAIDO
UNIVERSITY

The 18th IEEE International Workshop on Signal Processing Advances in Wireless Communications, Hokkaido, Japan.

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S15: Special Session on Signal Processing and Networking for the Internet-of-Things

Chairs: Kwang-Cheng Chen (University of South Florida, USA), **Li Wang** (Beijing University of Posts and Telecommunications, P.R. China)

S15.1 Semi-coherent Detector of Ambient Backscatter Communication for the Internet of Things

Jing Qian and Feifei Gao (Tsinghua University, P.R. China); Gongpu Wang (Beijing Jiaotong University, P.R. China); Shi Jin (Southeast University, P.R. China); Hongbo Zhu (Nanjing University of Posts and Telecommunications, P.R. China)

S15.2 Graph-Based Time-Critical Cooperative Data Exchange in V2V via Network Coding Strategy

Yanyan Lu (Beijing University of Posts and Telecommunications, P.R. China); Qimei Cui and Yanzhao Hou (Beijing University of Posts and Telecommunications, P.R. China); Zhenguo Gao (Harbin Engineering University, P.R. China); Zhang Baofeng (China Information Technology Security Evaluation Center, P.R. China)

http://spawc2017.org/docs/ieeespawc2017_brochure_web.pdf



The First Workshop on the Age of Information - Call For Papers



➤ Workshop Organizers

- Yin Sun, Auburn University
- Anthony Ephremides, University of Maryland

➤ Technical Program Co-chairs

- Yin Sun, Auburn University
- Anthony Ephremides, University of Maryland
- **Bo Bai, Huawei** **Vice chair**



<http://www.itsoc.org/news-events/recent-news/the-first-workshop-on-the-age-of-information>

➤ Topics of Interests:

- Age of Information Analysis and Optimization
- Age-based Source and Channel Coding
- Age of Information and Information Theory
- Real-time Signal Tracking and Estimation
- Age of Channel State Information
- Age of Information in Robotics and Control Systems
- Age of Information and Security
- Age of Information and Networking
- Age of Information and Game Theory
- Data Freshness in Caches and Databases
- Fresh Big Data
- Fresh Data for Online Learning
- Applications of Age of Information



INTERNATIONAL SCHOOL Enabling Technologies, Applications, and Methods for Emerging 5G Systems

The School focuses on a program of lectures, assembled by experts in the area of 5G networks. The objective of this school is to teach the main features of emerging 5G technology from the networking perspective. Student will have the opportunity to participate in a stimulating forum of scientists, to present their own work, to obtain feedback and to start up collaborations. Lectures will provide background on 5G wireless communication concepts and particular emphasis will be placed on IoT paradigm, broadcast and multicast convergence in 5G network, D2D/M2M communications in 5G network. Through the course of the lectures, connections will be made to network architectures and protocols design, including radio resource management topics, while also introducing the mathematics associated with the analysis and optimization of wireless communication systems. The School is tailored towards Researchers, PhD, Masters, and Bachelor Students active or interested in future mobile networks. The School is held in the framework of the RUDN University Competitiveness Enhancement Program "5-100". The IEEE BTS Italy Chapter is technical co-organizer of the event. The School is also supported by the EUREKA student association from the University Mediterranea of Reggio Calabria.

ORGANIZING AND PROGRAMME COMMITTEE
Giuseppe Araniti (Italy); Konstantin Samouylov (Russia); Yevgeni Koucheryov (Finland); Sergey Andreev (Finland)

ORGANIZERS
University Mediterranea of Reggio Calabria – DIIES Dep. (Italy)
Peoples' Friendship University of Russia (RUDN University) (Russia)
Tampere University of Technology (Finland)
IEEE BTS Italy Chapter

October 2017
University Mediterranea of Reggio Calabria
REGGIO DI CALABRIA, ITALY

MARKETING-MEDITERRANEA

School Objective:

- Teach the main features of emerging 5G technologies from the networking perspective.
- Students had the opportunity to participate in a stimulating forum of scientists, to present their own work, to obtain feedbacks and to start up collaborations.

School Topics:

- Background on 5G wireless communication concepts,
- IoT paradigm,
- Broadcast/multicast convergence in next-generation networks,
- D2D/M2M communications in 5G networks.

School Organizers:

- **University Mediterranea of Reggio Calabria – DIIES Dep. (Italy)**
- Peoples' Friendship University of Russia (RUDN University) (Russia)
- Tampere University of Technology (Finland)
- IEEE BTS Italy Chapter

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Ongoing Activities

➤ Ongoing Activities—2 items

- Special Issue: IEEE ACCESS
- IEEE SPAWC 2018

IEEE Access®

SPAWC 2018

19th IEEE INTERNATIONAL WORKSHOP ON SIGNAL PROCESSING ADVANCES IN WIRELESS COMMUNICATIONS

25-28 JUNE, KALAMATA, GREECE

➤ IEEE Access:

- ✓ **Special Issue** on “Innovative Spectrum Sharing Techniques for D2D communications”

➤ Guest Editors

✓ Dr. Li Wang (Lead)

- Beijing university of Posts and Telecommunications, BUPT, China
- liwang@bupt.edu.cn

✓ Dr. Mauro Fadda

- Electronic and Information Engineering at the University of Cagliari, Italy
- mauro.fadda@diee.unica.it

✓ Dr. Vlad Popescu

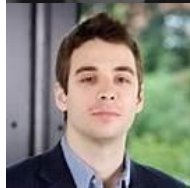
- Transilvania University of Brasov, Romania
- vlad.popescu@unitbv.ro

✓ Dr. Adrian Kliks

- Poznan University of Technology, Poland
- adrian.kliks@put.poznan.pl

✓ Dr. Alexander M. Wyglinski

- Associate Professor of Robotics Engineering at Worcester Polytechnic Institute, Worcester, MA, USA, as well as the Director of the Wireless Innovation Laboratory (WI Lab)
- alexw@wpi.edu



➤ Topics

- D2D network performance evaluation;
- D2D network design;
- D2D communications for 5G networks;
- Cognitive radio and dynamic spectrum sharing for D2D deployment in TVWS;
- Spectrum regulation and management aspects for D2D networks;
- Energy and spectral efficiency;
- Software Defined Networks (SDN) and Software Defined Radio (SDR) for D2D communications;
- D2D standardization;
- Interference and power control;
- Radio resource allocation and scheduling;
- D2D non-orthogonal multiple access (NOMA) frameworks;
- Security and privacy for D2D communications;
- Vehicle-to-everything (V2X) communications;
- Machine-to-Machine (M2M) communications;
- Novel services and applications;
- Biologically-inspired techniques for D2D spectrum management
- Deep and reinforcement learning for D2D;
- IoT architectures for D2D;
- Social networking for D2D;
- D2D sensor networks and cyber-physical systems;
- Visual light communications-based D2D;
- Satellite communications and deep space-based D2D networks;
- D2D test-beds, prototypes, and implementations.

➤ 19th IEEE International Workshop on Signal Processing Advances in Wireless Communications (SPAWC 2018)

➤ Objective:

- Advances in signal processing for wireless communications networking
- Advances in information theory

➤ Particular focus on the areas

- ◆ Machine learning and data analytics
 - Physical-layer security and privacy
 - Biological communications and signal processing
 - 5G and beyond

➤ Special session proposals and regular papers are being

◆ Reception

- Distributed resource allocation and scheduling
- Convex and non-convex optimization; game theory for communications
- Heterogeneous networks, small cells
- Millimeter wave, 60 GHz communications
- Full duplex systems
- Cognitive radio and networks
- Cooperative sensing, compressed sensing, sparse signal processing
- Machine-to-machine, device-to-device communications
- Modeling, estimation and equalization of wireless channels
- Acquisition, synchronization, localization and tracking
- Low latency & delay-limited communications
- Signal processing for optical, satellite, and underwater communications
- Energy efficiency and energy harvesting

Organizer: Bo Bai and Trung Q. Duong



◆ Solicited in the general areas

- Smart antennas, MIMO systems, massive MIMO, and space-time processing
- Reliable wireless communications for autonomous vehicles
- Signal processing for ad-hoc, multi-hop, and sensor networks
- Cooperative communication, coordinated multipoint transmission and

*Thank you !
Welcome!*

SIG on Social Behaviour Driven Cognitive Radio Networks

Scope and Objectives

In the last two decades, cognitive radios have emerged as an efficient way to improve spectrum utilization and provide more flexibility in networking. A significant change in cognitive radio networks (CRNs) recently is putting social behaviour in the loop. Many social behaviours can be sensed and even predicted by the machine learning and artificial intelligence (AI) based smart applications. In this context, the social behaviour is a new driven force for better performance in CRNs. In addition, emerging smart applications can strongly affect social behaviour, which will be a new driven force for proposing new applications in CRNs as well. In this social behaviour driven CRNs, critical technical problems should be solved to realize the potential benefits, e.g., how to efficiently formulate and utilize human-device interactions to boost communication performance since the device holder are supposed to be mobile regularly, and how to facilitate the benefits of considering social behaviours and application characteristics from utilizing the devices' capability of caching and computing. Another major challenge is how to sense and understand social behaviours and application characteristics. In this SIG group, we provide a platform on the development of social behaviour driven CRNs to exploit and explore new dimensions.

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