

## **SIG Name: Cognitive Communications and Networking in Cyber-Physical Systems (CCNCPS)**

### **Proposed Chair:**

Dr. Xianghui Cao  
Southeast University, Nanjing, China  
xhcao@seu.edu.cn

### **Proposed Vice-Chairs:**

Dr. Xiangwei Zhou  
Louisiana State University, USA  
E-mail: xwzhou@lsu.edu

Dr. Enrico Natalizio  
Université de Technologie de Compiègne, France  
E-mail: enrico.natalizio@hds.utc.fr

Dr. Ruilong Deng  
University of Alberta, Canada  
E-mail: dengruilong@gmail.com

### **External LinkedIn Group web address (or equivalent, if applicable):**

Under construction. We plan to post the regular information exchange among the SIG members through a Google Group. Dr. Xianghui Cao will take the lead in providing the contents of the first version of the SIG website on ComSoc TCCN website.

### **Scope and Objectives:**

Cyber-physical systems (CPS) are emerging as an interdisciplinary technology that integrates various types of sensing, communication, actuation and computation devices to enable smart interaction between human beings and the physical world. Typical CPS examples include smart grid, Internet of things, vehicular networks, robotic systems, and Tactical Internet. In order to provision reliable, real-time and secure communications in CPS, there are significant challenges to be addressed such as devices' heterogeneous communication capabilities, mixed traffic patterns (e.g., periodic and event-triggered), capability of maintaining satisfactory communication quality in dynamic and harsh working environment (e.g., with high temperature, high mobility and high electromagnetic interference), and interplay with the physical system dynamics. Therefore, the communication network should be "cognitive" concerning not only the dynamic spectrum availability as the cognitive radio does, but also the dynamic changes of the environment and physical systems. This calls for context-aware adaptive

designs of cognitive channel allocation, medium access, link scheduling, routing, and advanced technologies such as cross-layer design, multi-objective optimization, game-based, and machine-learning-based approaches. This CCNCPS SIG group will concentrate on cognitive communications and networking in CPS, aiming at providing a platform for researchers and practitioners to share their ideas, key technologies, and latest results in this area.

### **Proposed activities for the first 12 months:**

The SIG sponsors and promotes technical publications, workshops, tutorials, student activities and other related activities in the areas relevant to cognitive communications and networking in CPS. In the first 12 months, we plan to conduct the following activities:

- Propose workshops in the major and flagship IEEE conference of INFOCOM, ICC and GLOBECOM. We will also publicize the CCNCPS SIG group and propose workshops in leading conferences of related societies such as IEEE IECON, CDC, SMC, etc.
- Propose special issues on leading journals such as IEEE JSAC, Trans. on Cognitive Communications and Networks, Trans. on Communications, Trans. on Mobile Computing, Trans. on Vehicular Technology, Trans. on Networking, Trans. on Automatic Control, Trans. on Control of Network Systems, Internet of Things Journal, Communication Mag., IEEE Network, etc.
- Organizing regular meetings and advertisings in ways such as during special sessions at related conferences (INFOCOM, ICC, GLOBECOM, etc.), on the personal web pages of the SIG organizers, and through an email distribution list of potential members.
- Invite some talks in workshops or regular meetings for this SIG from the world renowned researchers.

### **Advisory Board**

#### **Chair:**

Dr. Geoffrey Ye Li, IEEE Fellow

Georgia Institute of Technology, USA

E-mail: liye@ece.gatech.edu

#### **Senior Advisors:**

Dr. Dusit (Tao) Niyato, IEEE Fellow

Nanyang Technological University, Singapore

E-mail: dnyato@ntu.edu.sg

Dr. Yu Cheng

Illinois Institute of Technology, USA

E-mail: cheng@iit.edu

Dr. Jianhui Wang

Southern Methodist University and Argonne National Laboratory, USA

E-mail: jianhui@smu.edu

**Founding Members:**

- M Cenk Gursoy, Syracuse University, USA
- Yan Zhang, University of Oslo, Norway
- Tony Q. S. Quek, Singapore University of Technology and Design, Singapore
- Jiming Chen, Zhejiang University, China
- Cailian Chen, Shanghai Jiaotong University, China
- Walid Saad, Virginia Tech, USA
- Xiang Cheng, Peking University, China
- Hao Liang, University of Alberta, Canada
- Fen Hou, University of Macau, Macau
- Chia-Ho Ou, National Pingtung University, Taiwan
- Mianxiong Dong, Muroran Institute of Technology, Japan
- Sangheon Pack, Korea University, Korea
- Chau Yuen, Singapore University of Technology and Design, Singapore
- Xu Chen, Sun Yat-Sen University, China
- Jiong Jin, Swinburne University of Technology, Australia
- Sabita Maharjan, Simula Research Laboratory, Norway
- Kaoru Ota, Muroran Institute of Technology, Japan
- Xiaohua Tian, Shanghai Jiaotong University, China
- Wayes Tushar, Singapore University of Technology and Design, Singapore
- Xianghui Cao, Southeast University, China
- Xiangwei Zhou, Louisiana State University, USA
- Enrico Natalizio, Université de Technologie de Compiègne, France
- Ruilong Deng, University of Alberta, Canada