
Preface

WCSN 2017

4th Annual International Conference on Wireless Communication and Sensor Network (WCSN 2017) was held in Wuhan, China, from 15-17 December 2017. WCSN2017 is to offer scholars, professionals, academics and graduate students to present, share, and discuss their studies from various perspectives in the aspects of wireless communication and sensor network. These proceedings tend to collect the up-to-date, comprehensive and worldwide state-of-art knowledge on information technology and application. All accepted papers were subjected to strict peer-reviewing by expert referees. The papers have been selected for this proceedings based on originality, significance, and clarity for the purpose of the conference. The selected papers and additional late-breaking contributions to be presented will make an exciting technical program on conference. The conference program is extremely rich, featuring high impact presentation. We hope this conference will not only provide the participants a broad overview of the latest research results on information technology, but also provide the participants a significant platform to build academic connections.

The Technical Program Committee worked very hard to have all papers reviewed before the review deadline. The final technical program consists of 56 papers. There are three keynote speeches and three invited sessions. The keynote speakers are internationally recognized as a leading expert in the research field of information technology who has demonstrated outstanding proficiency and has achieved distinction in his profession. The proceedings were published as a volume in by EDP science.

We would like to express our sincere gratitude to all the members of Technical Program Committee and organizers for their enthusiasm, time, and expertise. Our deep thanks also go to many volunteers and staffs for the long hours and hard work they have generously given to WCSN 2017. Finally, we would like to thank all the authors, speakers, and participants of this conference for their contributions to WCSN 2017, and also looks forward to welcoming you to WCSN 2018.

Prof. Hyunsung Kim

Program Chair

Prof. Hyunsung Kim, Dept. of Cyber Security, Kyungil University, Full Professor, Korea.

Program Chair

Prof. Chen Wang, Associate Professor, School of Electronic Information and Communications, Huazhong University of Science & Technology, China.

Co-Chair

Prof. Hui Yang, Associate Professor, Beijing University of Posts and Telecommunications (BUPT), China

Editor

Tong Chen, Professor in Affective Computing, School of Electronic & Information Engineering Southwest University Chongqing, China

Chen Wang, School of Electronic Information and Communications, Huazhong University of Science & Technology, Associate Professor, China

Kei Eguchi, Department of Information Electronics, Fukuoka Institute of Technology, Professor, Japan

Ning Zhang, Beijing Union University, China, Professor, China

Hongzhi Wang, School of computer science and technology, Harbin Institute of Technology, Professor, China

Technical Program Committee

Jianlun Wang, China Agricultural University, Associate Professor, China

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Ding Wang, the PLA Information Engineering University, Associate
Professor, China
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professor, Croatia
HOANG TRONG MINH, Posts and Telecommunications Institute of
Technology (PTIT), lecturer, Vietnam
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Doctor, Taiwan, China
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Engineering, The University of Melbourne, Research Scientist, Australia
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Dezhong Peng, Sichuan University, Professor, China
Dr. Anna Kamińska-Chuchmała, Department of Informatics Wrocław
University of Science and Technology Poland, Assistant Professor, Poland
Bogdan TIGANOAIA, University of Bucharest, Ph.D, Romania
Dr Mohammed Aseeri, King Abdulaziz City for Science and Technology,
Assistance Professor, Saudi Arabia
Rony Darazi, Antonine University – TICKET Lab., Associate Professor,
Lebanese
Abdulaziz Alzubaidi, Umm al-Qura University, Saudi Arabia, Assistant
Professor, Saudi Arabia
Mohammad Z.Masoud, Al-Zaytoonah University of Jordan, Assistant
Professor, Jordan
Joarder Kamruzzaman, Federation University Australia and Monash
University Australia, Associate Professor, Australia
Dr.Nawab Muhammad Faseeh Qureshi, Sungkyunkwan University,
Researcher, South Korea
Mansoor Ahmed, COMSATS Institute of Information Technology,
Islamabad, Pakistan, Assistant Professor, Pakistan
Mina Naghshnejad, University of California Merced, California, United
States, PhD Candidate, America
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Dr.Md Ilean Pramanik, City University of Hong Kong, Hong Kong, China
Assistant Professor, Bangladesh Sattar Ameri, Wayne State university, PhD.,
Iran

Dr. Youssef SAID, Tunisie Telecom, Professor, Tunisia

Jiannan Zhai, Institute for Sensing and Embedded Network Systems
Engineering, Florida Atlantic University, Chief Engineer, Assistant Research
Professor, China

Mahtab Jahanbani Fard, Wayne State University, Researcher scholar, Iran

Dr. R. Raja, Alagappa University, Assistant Professor, India

Svetlana Zhelyazkova Vasileva-Boyadzhieva, Varna University of
Management, Lecturer, Associate professor, Bulgaria

Ray-Hwa Wong, Department of Mechanical Eng., Hwa-Hsia University of
Technology, Associate professor, Taiwan, China

A.D.N.SARMA, Centre for Good Governance, Hyderabad, Sr. Technical
Consultant, India

Bogdan Tiganoaia, Politehnica university of Bucharest, Assistant Professor,
Romania

Dimitris Kanellopoulos, University of Patras, Research Fellow, Greece

Hyunsung Kim, Kyungil University, Professor, Korea

Mumtaz Karatas, National Defense University, Turkish Naval Academy,
Assistant Professor, Turkish

Trong- Minh Hoang, Telecoms Faculty, Posts and Telecommunication
Institute of Technology, Dr, Lecturer, Vietnam

Akhlaqur Rahman, Swinburne University of Technology, PhD Researcher,
Bangladeshi

Bhadrachalam C, Amrita University, Associate Professor

Jasmine Seng K. P., Charles Sturt University, Adjunct Professor

Mohamed Mahmoud Gomaa, National Research Centre, Associate Professor,
Egypt

Amir R. Ali, German University, Assistant Professor, Egypt

General Chair Prof. Hyunsung Kim

POSITIONS HELD

- Full Professor (2014 - present), Dept. of Cyber Security, Kyungil University, Kyungbuk, Korea. Teaching the computer engineering and security related subjects.
- Visiting Professor (2016, two years), Dept. of Mathematical Sciences, University of Malawi, Zomba, Malawi. Visiting Prof. Levis Eneya
- Associate Professor (2012 - 2013), Dept. of Cyber Security, Kyungil University, Kyungbuk, Korea. Teaching the computer engineering and security related subjects.
- Associate Professor (2002 - 2011), Dept. of Computer Engineering, Kyungil University, Kyungbuk, Korea. Teaching the computer engineering and security related subjects.
- Visiting Professor (2009, a year), School of Computer, Dublin City University, Dublin, Ireland. Visiting
- Editorial Board (2002 - present), Korea Institute of Information Security and Cryptology, Seoul., Korea. Gave advices for the domestic journal
- Senior Researcher (2000 - 2002), Ditto Technology, Daegu., Korea. Directing research on the hardware implementation of the basic architectures for the public-key cryptosystem

COURSES TAUGHT:

- Network Security (Each Fall 2004-present; 3 credits). Department of Computer Engineering, Kyungil University, Korea
- Data Structure (Each Spring 2004-present; 3 credits), Department of Computer Engineering, Kyungil University, Korea.
- Formal Languages and Automata (Each Spring 2002-present; 3 credits). Department of Computer Engineering, Kyungil University, Korea
- Information Security (Each Fall 2002-present; 3 credits). Department of Computer Engineering, Kyungil University, Korea
- Computers (Every Semester 1998-2001; 3credits), Department of Computer Engineering, Kyungpook, National University, Korea.

Co-Chair Prof. Hui Yang

Hui Yang received B.E and Ph. D degree in communication and information systems from Beijing University of Posts and Telecommunications (BUPT), Beijing, China, in 2009 and 2014. He is currently an associate professor of Institute of Information Photonics and Optical Communications at BUPT, working on many China national (including NSFC, 973, 863, etc.) and international projects regarding optical networking and communication technologies. His main research interests include network architecture, software defined optical network (SDON), dynamic optical network, flexible band width optical network, cross-stratum optimization (CSO) and network protocols and algorithms. He has authored or coauthored more than 60 peer-reviewed papers related to the previously mentioned research topics in prestigious international journals and conferences, and he is the first author of more than 30 of them. He presented several invited papers in international journals and conferences, including many prestigious ones such as Scientific Reports, IEEE Communications Magazine, Optics Express, IEEE JOCN, Optical Switching and Networking, INFOCOM, OFC, ECOC and GLOBECOM etc. He got the Best Paper Award in NCCA 2015. Also, he is an active reviewer for several international journals, and I have previously reviewed more than 30 manuscripts in the following journals.

Program Chair & Editor Associate Professor Chen Wang,

Associate Professor, School of Electronic Information and Communications, Huazhong University of Science & Technology, China

EDUCATION

Sept. 2008 – Jun. 2013: Ph.D Degree, Dept. of Automation, Wuhan University, Wuhan, China
Doctoral Dissertation: Energy Efficient Schemes and Algorithms for Underwater

Sept. 2004 – Jun. 2008: B.E. Degree, Dept. of Automation, Wuhan University, Wuhan, China

WORK EXPERIENCE

Jun. 2017 – present: Associate Professor, School of Electronic Information and Communications, Huazhong University of Science and Technology, Wuhan, China

Jun. 2013 – Jun. 2017: Pos-Doc, School of Electronic Information and Communications, Huazhong University of Science and Technology, Wuhan, China Supervised by Prof. Hongbo Jiang

RESEARCH INTERESTS

Internet of Things / Wireless Sensor Networks / Pervasive and Mobile Computing / Location Based Services / Privacy Preserving / Mobile Crowdsensing / Topology Identification and Geometric Algorithm / etc.

COMPETENCE

In-depth knowledge of communication protocols and algorithms in wireless network

Skilled at C/C++, Java, Matlab and OpenGL

Proficient in Android application development

Familiar with Graph Theory, Stochastic Process, Machine Learning, Data Mining, Optimization, etc.;

Talented in problem solving and analyzing, Ability to work in fast-paced, intense environment, and under pressure to meet deadlines, Excellent team player

Editor Prof. Tong Chen

Professor in Affective Computing, School of Electronic and Information Engineering Southwest University, Chongqing, 400715, China

RESEARCH EXPERIENCES

Signal Processing & Image Processing: Algorithm development, mathematical modeling, image enhancement, data visualization.

Affective Computing: Stress detection using hyperspectral imaging technique, affective physiological signal acquisition, affective feature extraction and selection, emotion understanding and recognition. In charge of a lab since 2012 for remote sensing human emotions (there are hyperspectral imager, somatosensory cameras, HD cameras available for the research).

Biomedical Engineering: Developing algorithms for remote measuring physiological signals including HR, HRV, breathing rate, GSR, and tissue oxygen saturation.

EMPLOYMENT

11/2016-present Professor, Southwest University, China

11/2011---10/2016 Associate Professor, Southwest University, China

11/2006---11/2011 Lecturers, Southwest University, China

07/2002---11/2006 Assistant Professor, Southwest University, China

RESEARCH PROJECTS

01/2014-12/2016 Hyperspectral Imaging Human Blood Oxygenation and Emotion (Natural Science Foundation China, [CNY280,000]): Principle Investigator, developing robust and real-time algorithm for generating tissue oxygen saturation (StO₂), investigating facial StO₂ patterns under positive and negative affective states, and investigating the relationship between HR response and StO₂ response to affective states.

01/2013-12/2015 Remote Sensing Human Emotions Using StO₂ (China Ministry of Education [CNY300,000]): Principle Investigator, selecting optimized wavelength for generating StO₂, investigating facial StO₂ patterns under two kinds of emotions, and extracting features for discriminating the two emotions.

2008-2011 Remote Detection of Stress Using Imaging Technique (UK MOD): This is a 3-year project with £433.8K support. My work focused on developing algorithm to produce StO₂, detecting stress using hyperspectral imaging technique.

2011-2014 Research on Emotion Interaction between Human and Computer Based on Physiological Signal (China MOE): This is a 3-year project with 1 Million CNY support. My work focused on investigating the techniques that can be used for remote sensing physiological signals, and developing algorithms for remote measuring HR, HRV, and RR.

Editor Prof. Kei Eguchi

Professor, Department of Information Electronics, Fukuoka Institute of Technology, Fukuoka, Japan

RESEARCH TOPICS:

Switching converters, Intelligent systems, Non-thermal food processing

EDUCATIONAL BACKGROUND:

1990.4-1994.3: Department of Electrical Engineering and Computer Science, Kumamoto University

1994.4-1999.3: Graduate School of Science and Technology, Kumamoto University

1999.3 : Received Ph.D.

EMPLOYMENT RECORD:

1999.4-2000.12: Lecturer

Department of Information and Computer Sciences, Kumamoto National College of Technology

2001.1-2003.3: Associate Professor

Department of Information and Computer Sciences, Kumamoto National College of Technology

2003.4-2006.3: Associate Professor

Department of Electronic Engineering, Kumamoto National College of Technology

2006.4-2012.3 : Associate Professor

Department of Technology Education, Shizuoka University

2012.4- Present : Professor

Department of Information Electronics, Fukuoka Institute of Technology

2015.9-2015.11: Visiting Scholar, California State University, Eastbay, USA

Editor Prof. Ning Zhang

Dr. Ning Zhang, male, Professor, Beijing Union University, China. Ning Zhang received the MS degree in Physics science from Hefei University of Technology in 1992, and the PhD degree in Optics science from the department of Optics Engineering, University of Tianjin in 2002. From 2002-2004, as a postdoctoral research fellow, he worked in Beijing University of Posts and Telecommunications. He is currently a professor in Beijing Union University. His research interests are in the areas of Communication Science, Computer Network Technology, Information Systems, Software Engineering, Education Management, etc. Dr. Ning Zhang, is invited reviewer for the following international journals: Chinese Journal of Electronics (China, SCI), Mathematical Problems in Engineering (USA.SCI), Optics Communications (USA. SCI),etc. Areas of Interest: Communication Science, Computer Network Technology.

Editor Prof. Hongzhi Wang

Harbin Institute of Technology

RESEARCH INTERESTS

Big Data Management and analysis, Data Quality, Web Database, Graph, Database, Information Integration,

WORK AND RESEARCH EXPERIENCES

Professor Harbin Institute of Technology Harbin, China, 2015.12-Now

Teach and research on database research, including big data management and analysis, data quality, and graph management

Associate Professor Harbin Institute of Technology , Harbin, China, 2010.9 –2015.12

Teach and research on database research, including XML database, data quality, sensor network and information integration

Visiting Scholar University of California Irvine, USA, 2012.9-2013.9 Research on Big Data Management

Lecturer Harbin Institute of Technology Harbin, China, 2008.7 –Present

Teach and research on database research, including XML database, data quality, sensor network and information integration

Star Track Program of Visiting Researcher, Microsoft Research Asia Beijing, China 2011.4 – 2011.10

Research on distributed graph management

Graduate Student Researcher, Harbin Institute of Technology Harbin, China, 2000.4 – 2008.7

Focused on database research, including XML database, compressed database and information integration

Visiting Research Associate University of New South Wales Sydney, Australia, 2004.5-2005.4

Researched on efficient query processing of XML

Keynote Prof. Ting Yang

School of Electrical Engineering and Automation, Tianjin University, Tianjin, China

Dr. Ting Yang is currently a Chair professor of Theory and Advanced Technology of Electrical Engineering, at the School of Electrical Engineering and Automation, Tianjin University, China. He was the cooperative research staff of Imperial College London (2008), University of Sydney, Australia (2011, 2015). Prof. Yang is the winner of the “New Century Excellent Talents in University Award” from Chinese Ministry of Education. He is the leader of tens of research grant projects, including the International S&T Cooperation Program of China, the National High-Tech Research and Development Program of China (863 Program), the National Natural Science Foundation of China, and so on. Prof. Yang is the chairman of two workshops of IEEE International Conference, and the editor in Chief of one of Special Issues of the international journal of DSN. He is the author/co-author of four books, more than one hundred publications in internationally refereed journals and conferences. Prof. Yang is a senior member of the Chinese Institute of Electronic, the fellow of Circuit and System committee, the fellow of Theory and Advanced Technology of Electrical Engineering, and the member of International Society for Industry and Applied Mathematics. His research fields include Smart Grid, advanced metering infrastructure, and information and communication technologies in electric power system.

Keynote Prof. Lei Zhang

Lei Zhang received his Ph.D degree in Circuits and Systems from the College of Communication Engineering, Chongqing University, Chongqing, China, in 2013. He was selected as a Hong Kong Scholar in China in 2013, and worked as a Post-Doctoral Fellow with The Hong Kong Polytechnic University, Hong Kong, from 2013 to 2015. He is currently a Professor/Distinguished Research Fellow with Chongqing University. He has authored more than 50 scientific papers in top journals, including the IEEE Transactions on Neural Networks and Learning Systems, the IEEE Transactions on Image Processing, the IEEE Transactions on Multimedia, the IEEE Transactions on Instrumentation and Measurement, the IEEE Transactions on Systems, Man, and Cybernetics: Systems, the IEEE Sensors Journal, Information Fusion, Sensors & Actuators B, and Analytica Chimica Acta. His current research interests include machine learning, pattern recognition, computer vision, electronic olfaction and intelligent systems.

Keynote Prof. Hui Zhang

Hui Zhang received the B.S. degree and PhD. degree respectively in 2005 and 2010, both from Beijing University of Posts and Telecommunications. In 2010, he became a faculty member in the School of Information Science in Nankai University, Tianjin, China. From 2013-2014, he was a postdoctoral research fellow respectively in University of Southampton and Korea Advanced Institute of Science and Technology. He is currently an associated professor in Nankai University. His research interests are in the areas of Wireless Networks, Visible Light Communication, Social Networks, Energy Internet, etc. Currently He is the reviewer for the following journals: IEEE Transactions on Wireless Communication, IEEE Transactions on Mobile Computing, IEEE Transactions on Vehicular Technology, EURASIP Journal on Wireless Communications and Networking, IEEE Globecom, IEEE VTC, Chinese Journal of Electronics.

Keynote Prof. Lei Zhang

Lei Zhang received his Ph.D degree in Circuits and Systems from the College of Communication Engineering, Chongqing University, Chongqing, China, in 2013. He was selected as a Hong Kong Scholar in China in 2013, and worked as a Post-Doctoral Fellow with The Hong Kong Polytechnic University, Hong Kong, from 2013 to 2015. He is currently a Professor/Distinguished Research Fellow with Chongqing University and also the founder of Learning Intelligence & Vision Essential (LiVE Group). He has authored more than 70 scientific papers in top journals, including the IEEE Trans. Neural Networks and Learning Systems, the IEEE Trans. Image Processing, the IEEE Trans. Multimedia, the IEEE Trans. Instrumentation and Measurement, the IEEE Trans. Systems, Man, and Cybernetics: Systems, etc. His current research interests include machine learning, pattern recognition, computer vision and intelligent systems. He has been a reviewer for more than 50 journals such as IEEE Transactions (T-IP, T-MM, T-CSVT, T-CYB, T-SMCA, T-IM, T-IE), and so on. He also serves as keynote speaker, area chair, session chair, and program committee for more than 20 international conferences. Dr. Zhang was a recipient of Outstanding Reviewer Award of Sensor Review Journal in 2016, Outstanding Doctoral Dissertation Award of Chongqing, China, in 2015, Hong Kong Scholar Award in 2014, Academy Award for Youth Innovation of Chongqing University in 2013 and the New Academic Researcher Award for Doctoral Candidates from the Ministry of Education, China, in 2012.

Keynote Prof . Xiong Li

EDUCATION BACKGROUND

PhD in Weapon System Engineering, Academy of Armored Force Engineering, 2003-2009

Masters of Command Information System, Academy of Armored Force, 1997-2000

Bachelor of Command Technology and Engineering, Academy of Armored Force Engineering, 1993-1997

TEACHING EXPERIENCE

Military Operations Research (Undergraduate Course), 2003-2013

Complex System Modeling (Graduate Course), 2007-2016

System Analysis and System Engineering (Graduate Course), 2011-2016

Intelligent Decision-making (Graduate Course), 2011-2016

SELECTED ACADEMIC AWARDS

PhD thesis entitled “*Study on Warfare System Modeling Based on Meta-agents Interaction Chain*” was nominated as one of the **30 Chinese PLA most excellent doctor theses** in 2010 and the **100 national most excellent doctor theses** in 2011, respectively.

Keynote Prof. Wei Chih Hsu

Department of Computer and Communication Engineering, National Kaoshiung First University of Science and Technology

EDUCATION

Ph.D., Graduate Institute of Electrical Engineering, National Taiwan University, Taiwan, 09/1978 to 04/1984

Visiting scholar, Purdue University, U.S. 02/1984 to 02/1985

WORK HISTORY

Professor, Department of Computer and Communication Engineering, National Kaoshiung First University of Science and Technology, 02/1986-Present

Associate Research, Chunghwa Telecom Co., Ltd., 04/1984—01/1986

AWARDS:

Excellent teachers (counseling students admitted to "IPMA International Professional Management Project ", 2011,2012,2013