

**The 4<sup>th</sup> IEEE Cyber Science and Technology Congress (CyberSciTech 2019)**  
**17<sup>th</sup> IEEE Intl Conf on Dependable, Autonomic and Secure Computing (DASC 2019)**  
**17<sup>th</sup> IEEE Intl Conf on Pervasive Intelligence and Computing (PICom 2019)**  
**5<sup>th</sup> IEEE Intl Conf on Cloud and Big Data Computing (CBDDCom 2019)**

*Venue: Hotel Nikko and Kyushu Sangyo University, Fukuoka, Japan*

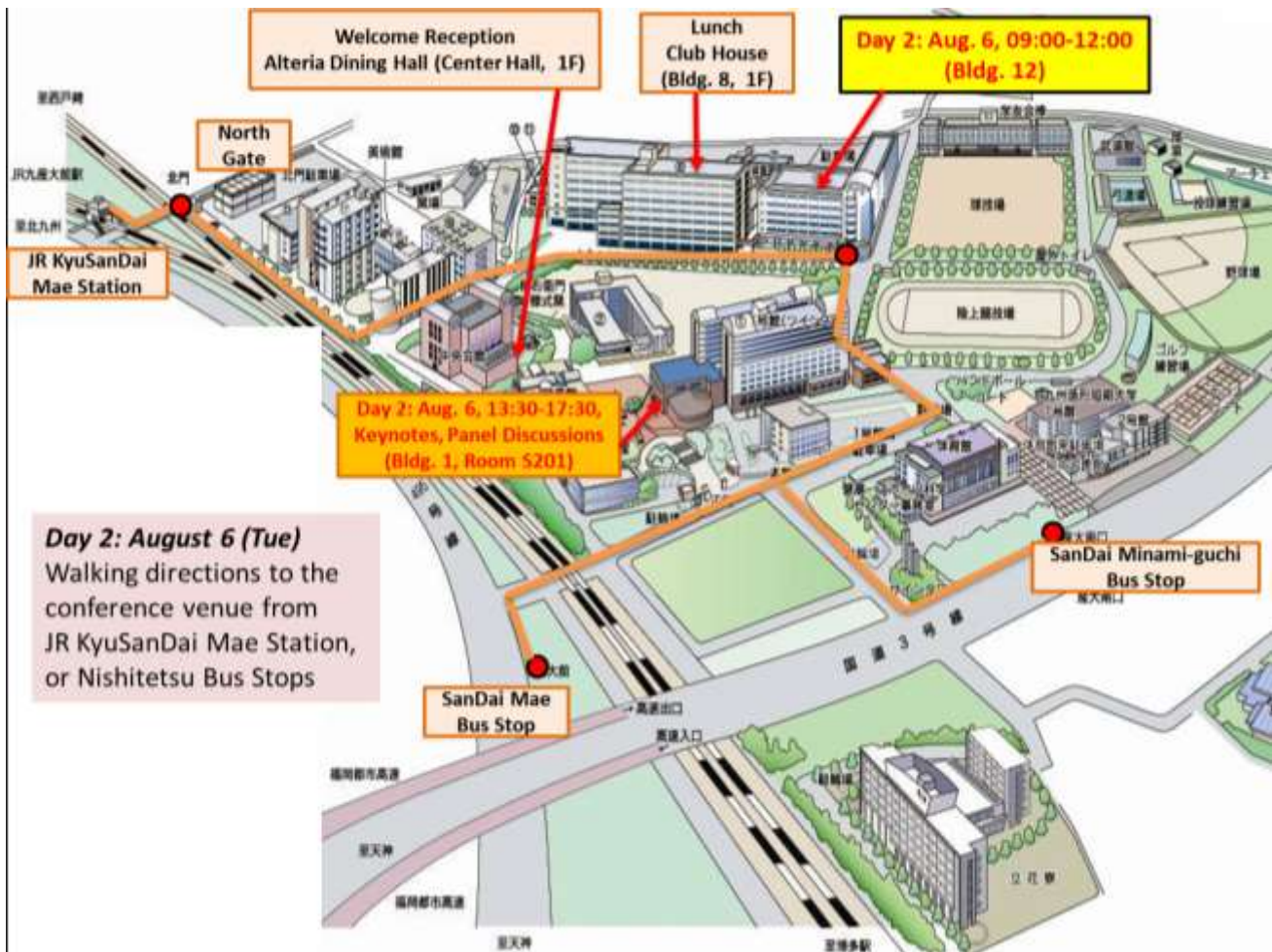
*Date: 05<sup>th</sup>-08<sup>th</sup> August 2019*

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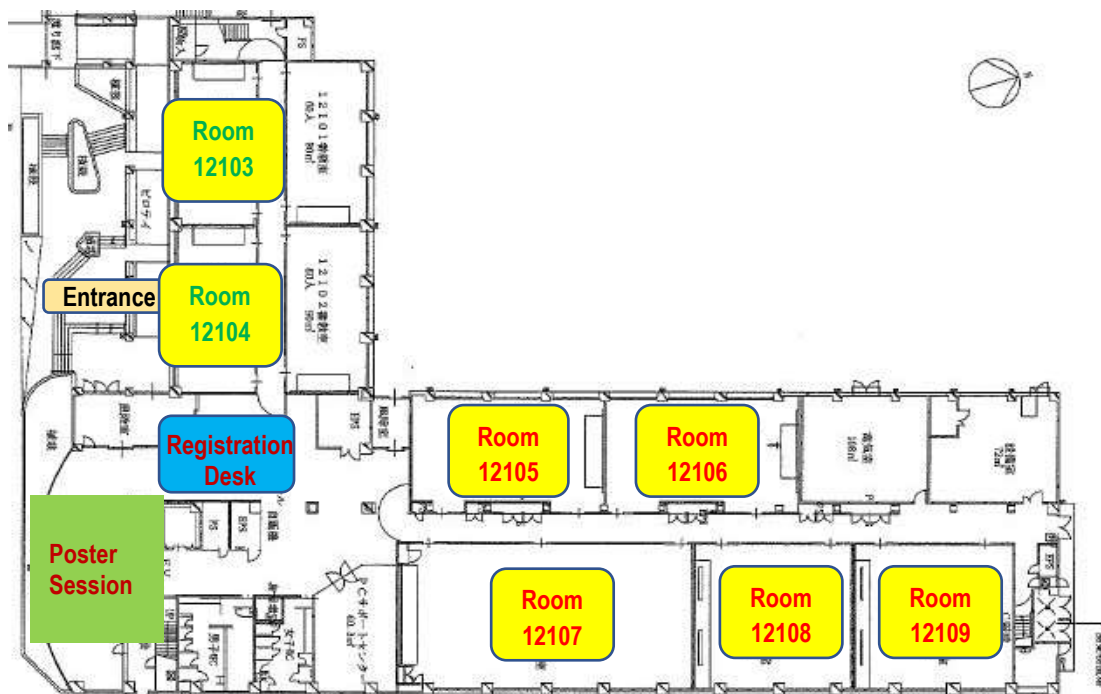
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## 6<sup>th</sup> August, Kyushu Sangyo University, Fukuoka



### 1st Floor, Building 12, Kyushu Sangyo University



# 2019 CyberSciTech/DASC/PICom/CBDCom Program Timetable

Day 1 - 5th August (Nikko Hotel)				
09:00-17:00	Registration - Registration Desk			
Room	Tsukushi (Big Hall)			
10:00-10:40	Conference Opening -			
10:40-11:20	Keynote I - Isao ECHIZEN			
11:20-12:00	Keynote II - Frank HSU			
12:00-13:00	Lunch			
Room	Room 1 (Tsutsuji)	Room 2 (Shobu)	Room 3 (Momiji)	Room 4 (Ume)
13:00-15:00	CST 1 (6)	PICom 1 (6)	DASC 1 (5)	CBDCom 1 (6)
15:00-15:20	Coffee break			
15:20-17:00	CST 2 (5)	PICom 2 (5)	DASC 2 (5)	CBDCom 2 (5)

Day 2 - 6th August (Kyushu Sangyo University)					
09:00-17:00	Registration - Registration Desk				
Room	Room 12105	Room 12106	Room 12108	Room 12109	Room 12103
9:00-10:20	CST 3 (4)	PICom 3 (4)	DASC WiP (5)	CBDCom 3 (4)	CST WiP 1 (5)
10:20-10:40	Coffee break				
10:40-12:00	CST 4 (4)	PICom 4 (4)	PICom Wksp (5)	CBDCom WiP (5)	CST WiP 2 (5)
12:00-13:25	Lunch/Poster sessions (15)				
Room	Room 12107				
13:30-14:10	Keynote III/Liming (Luke) CHEN				
14:10-14:50	Keynote IV/Cesare PAUTASSO				
14:50-15:30	Keynote V/Yuanshun DAI				
15:30-16:00	Coffee break				
16:00-17:30	Panel				
18:00-20:00	Welcome reception				

Day 3 - 7th August (Nikko Hotel)				
09:00-17:00	Registration/-			
Room	Room 1 (Tsutsuji)	Room 2 (Shobu)	Room 3 (Momiji)	Room 4 (Ume)
9:00-10:20	CST WiP 3 (5)	PICom Wksp (5)	CSSI 1 (5)	BCSec (4)
10:20-10:40	Coffee break			
10:40-12:00	CST WiP 4 (5)	CST WiP 5 (5)	CSSI 2 (5)	CSC&CEA (5)
12:00-13:00	Lunch			
13:00-15:00	CST 5 (6)	HISSD (7)	ADSN (7)	DeIS (7)
15:00-15:20	Coffee break			
15:20-17:00	CST 6 (5)	CyberIoT/ IoTonFEC (7)	Committee Meeting	
19:00-22:00	Banquet/Nikko Hotel			

Day 4 - 8th August	
10:00-12:00	Forum on Future Cyber Science and Technology (Kyushu University, Ito Campus)
13:00-17:00	Social Event (Details to be announced)

# 2019 CyberSciTech/DASC/PICom/CBDCom Program Preview

## Keynotes

**Keynote I:** Isao ECHIZEN, Deputy Director General / Professor, National Institute of Informatics (NII), Japan

Protection and use of biometric identity information - new possibilities for media security and privacy

**Keynote II:** Frank HSU, Clavius Distinguished Professor / Director of Laboratory of Informatics and Data Mining, Fordham University, USA

Ranking and Scoring for Data Analytics and Combinatorial Fusion

**Keynote III:** Liming (Luke) CHEN, Professor, De Montfort University, UK

Computational Behaviour Analysis for Cyber-Physical Systems within Smart World

**Keynote IV:** Cesare PAUTASSO, Professor, University of Lugano (USI), Switzerland

On Liquid Software and the Programmable World

**Keynote V:** Yuanshun DAI, Dean of School of Cybersecurity / Professor, University of Electronic Science and Technology of China, China

Autonomic Computing for self-improving dependability in Large-Scale Computing System

## Joint Panel

**Topic: The Future Direction of Cybersecurity Research**

**Panel Moderators:**

**Koji Nakao**, National Institute of Information and Communications Technology, Japan

**Panelists:**

**Stephen S. Yau**, Professor, Arizona State University, USA

**Michael David**, Professor, The National Intelligence University, USA

**Zhong Chen**, Professor, Peking University, China

**Masato Tedara**, Professor, Tokyo Denki University, Japan

## CyberSciTech 2019 Sessions

**CyberSciTech Session 1:** Cyber Physical Computing and Systems

**CyberSciTech Session 2:** Cyberspace & Cyber Security I

**CyberSciTech Session 3:** Cyber Social Computing & Networks

**CyberSciTech Session 4:** Cyber Intelligence, Life & Mind I

**CyberSciTech Session 5:** Cyber Intelligence, Life & Mind II

**CyberSciTech Session 6:** Cyberspace & Cyber Security II

**CyberSciTech WiP Session 1:**

**CyberSciTech WiP Session 2:**

**CyberSciTech WiP Session 3:**

**CyberSciTech WiP Session 4:**

**CyberSciTech WiP Session 5:**

**CyberSciTech Poster Paper Session**

## CyberSciTech 2019 Workshops and Special Sessions

**HISDD:** The 2<sup>nd</sup> International Workshop on Healthcare with Intelligent Sensing, System, and Data

**BCSec:** The 1<sup>st</sup> International Workshop on Big Data Analytics for Cyber Security and Defence

**Cyber-IoT:** Special Session on Computing and Applications for Cyber Internet of Things

**CSC&CEA:** Special Session on Cyber Social Computing and Cyber-Enabled Applications  
**CSSI:** Special Session on Cyber System Security and Intelligence  
**IoTonFEC:** Special Session on the Impact of Internet of Things on the Future Elderly Care

## **DASC 2019 Sessions**

**DASC Session 1:** Dependable computing  
**DASC Session 2:** Reliable Computing  
**DASC WiP Session:** Security Analysis and Detection  
**DASC Poster Paper Session**

## **DASC 2019 Workshops**

**ADSN:** The 18<sup>th</sup> International Workshop on Assurance in Distributed Systems and Networks  
**DelIS:** The 1<sup>st</sup> International Workshop on Dependable Intelligent Systems

## **PICom 2019 Sessions**

**PICom Session 1**  
**PICom Session 2**  
**PICom Session 3**  
**PICom Session 4**  
**PICom Poster Paper Session**

## **PICom 2019 Workshops**

The 1<sup>st</sup> International Workshop on Intelligence Big Data Processing Infrastructure and Its Applications  
The 3<sup>rd</sup> International Workshop on Secure and Sustainable Computing and Communication Technologies for Smart Communities

## **CBDCom 2019 Sessions**

**CBDCom Session 1:** Analytics Theorem, Systems and Tools  
**CBDCom Session 2:** Big Data Intelligence and Applications  
**CBDCom Session 3:** Big Data Analysis & Applications and WiP Paper Session  
**CBDCom WiP Session**

## **Presentation Guidelines**

**1) Regular Paper: 20 min = 15 min Presentation+5 min Q&A.**

**2) Work-in-Progress, Workshop & Special Session Papers: 15 min = 12 min Presentation + 3 min Q&A.**

A laptop PC will be provided in each of the conference room. Please report to your session chair and upload your presentation slides ten minutes before your session begins.

**3) Posters: One A1-size poster stand (portrait style) will be provided for each presenter.**

During the poster session, each presenter will also give a 2 minutes speech to promote their poster and research.



## **Message from CyberSciTech 2019**

### **General Chairs, General Executive Chairs and Program Chairs**

Over the past decade, Cyber technologies are developing at a tremendous rate and becoming an inseparable part of our day to day lives. Challenges across Cyber technologies, ethics, and other traditional disciplines are also emerging. The future of Cyber Science and Technology will be of transdisciplinary nature that requires careful study, investigation, and discussion. The aim of CyberSciTech Congress is to address the broad challenges in Cyber Science and Technology and to offer a common platform for our fellow scientists, engineers, industrial practitioners, and researchers to present and exchange their latest ideas, discoveries, and implementations. Therefore, it is our great honor and pleasure to welcome all our participants to the 2019 Cyber Science and Technology Congress (CyberSciTech 2019) held in Fukuoka, Japan on 5-8 August, 2019. CyberSciTech 2019 is sponsored by the IEEE Computer Society. It is co-located with the 17th IEEE International Conference on Dependable, Autonomic & Secure Computing (DASC 2019), the 17th IEEE International Conference on Pervasive Intelligence and Computing (PICom 2019), and the 5th IEEE International Conference on Cloud and Big Data Computing (CBDCom 2019).

To address the comprehensive nature and emerging challenges of Cyberization, CyberSciTech 2019 offers six technical tracks on the topics of

- Track 1: Cyberspace Theory & Technology
- Track 2: Cyber Security, Privacy & Trust
- Track 3: Cyber Physical Computing & Systems
- Track 4: Cyber Social Computing & Networks
- Track 5: Cyber Intelligence & Cognitive Science
- Track 6: Cyber Life & Wellbeing

In addition, seven special sessions/workshops on the topics of

1. Workshop on Healthcare with Intelligent Sensing, System, and Data (HISSD),
2. Workshop on Big Data Analytics for Cyber Security and Defence (BCSec),
3. Workshop on Emerging Dependable Computing System Technologies and Applications (EDCSTA),
4. Special Session on Cyber Social Computing and Cyber-Enabled Applications (CSC&CEA),
5. Special Session on Computing and Applications for Cyber Internet of Things (Cyber-IoT),
6. Special Session on the Impact of Internet of Things on the Future Elderly Care (IoTonFEC),
7. Special Session on Cyber System Security and Intelligence (CSSI)

are jointly organized. Overall, CyberSciTech 2019 received 130 submissions covering a wide range of topics. Finally, 30 high quality regular papers, 24 Work-in-Progress papers, 4 poster papers are included in the 2019 Proceedings. Another 34 papers are accepted in the special sessions/workshops. All accepted papers are selected based on a rigorous peer review process.

It is our great pleasure to find and assemble a great organizing committee, which is the key to a successful event. We would like to take this chance to thank the entire organizing and steering committee, especially the Steering Committee Prof. Jianhua Ma (Chair), Prof. Qun Jin, Prof. Laurence Yang and Prof. Hui-Huang Hsu for their guidance; the General Chairs Prof. Bernady O. Aduhan, Prof. Kouichi Sakurai, and Dr. Kevin I-Kai Wang, for their dedicated hard work. We would like to present our gratitude to our General Executive Chairs Fuhua (Oscar) Lin and Prof. Keiichi Iwamura for their continuous support. Special thanks must go to our Program Chairs Prof. Henry Leung, Prof. Kim-Kwang Raymond Choo, and Prof. Kenichi Kourai, together with our Track Chairs Prof. Katina Kravets, Prof. Toshihiro Yamauchi, Prof. Yuji Suga, Prof. Celimuge Wu, Prof. Weimin Li, Prof. Ali Akber Dewan, Prof. Klimis Ntalianis, and Prof. Xiaokang Zhou, for their relentless effort in



promoting our conference and managing our rigorous review process. We would also like to thank our Workshop Chairs Prof. Wasim Ahmad, Prof. Zhou Su, and Prof. Young-Hoon Park in inviting and organizing many great and topical workshops and special sessions to enrich the coverage of our Congress. A successful event always rely on a great publicity team and special thanks must go to Prof. Lai Tu, Prof. Yier Jin, Prof. Syed Akhter Hossain, Prof. Maciej Huk, Prof. Chih-Chieh Hung, and Prof. Masato Oguchi.

Of course, we want to express our sincere gratitude to all authors, participants, PC members, and many others who greatly contributed to CyberSciTech 2019 in many different ways. We sincerely hope all of you find CyberSciTech 2019 stimulating and helpful to your future research work and research network building. Please enjoy your visit and stay in the Fukuoka, Japan!

Bernady O. Apduhan, Kouichi Sakurai, Kevin I-Kai Wang  
*General Chairs of CyberSciTech 2019*

Fuhua (Oscar) Lin, Keiichi Iwamura  
*General Executive Chairs of CyberSciTech 2019*

Henry Leung, Kim-Kwang Raymond Choo, Kenichi Kourai  
*Program Chairs of CyberSciTech 2019*

Katina Kravetska, Toshihiro Yamauchi, Yuji Suga, Celimuge Wu, Weimin Li, Ali Akber Dewan, Klimis Ntalianis, Xiaokang Zhou  
*Program Co-Chairs of CyberSciTech 2019*

## **Message from DASC 2019 Program Chairs and General Chairs**

It is our great pleasure to welcome you to the 17th IEEE International Conference on Dependable, Autonomic and Secure Computing (DASC 2019), hosted in Fukuoka, Japan in August 5-8, 2019.

DASC covers important and contemporary topics related to autonomy, dependability and security concerns in large-scale, complex distributed information systems. These systems face inevitable problems of accidental/deliberate faults, malicious attacks, illegal intrusions, and natural disasters, leading consequently to limitations in the availability and reliability. As a promising means to implement dependable and secure systems, autonomic computing technology can be explored. Trusted and autonomic computing and communications require scientific and technological advances in a wide variety of fields, as well as new software, system architectures, and communication systems that support the effective and coherent integration of the constituent technologies. Hence, DASC-2019 strives to bring together computer scientists, industrial engineers, and researchers to discuss and exchange experimental and theoretical results, experience, and case studies on all aspects of autonomic, dependable, and secure computing, its applications, and to identify new research topics and trend-setting ideas.

This year, IEEE DASC-2019 is co-located with IEEE PICom, IEEE CyberSciTech, and IEEE CBDCom. DASC-2019 received a good number of submissions covering a wide range of topics. Putting more emphasis on the quality, in the end, 10 full papers, 14 papers with 2 workshops, and 5 work-in-progress papers are included in the proceedings and to be presented in DASC-2019. All accepted papers are selected based on a rigorous peer review process. To encourage authors and promote the work presented at DASC, we are delighted to inform that a selection of the best papers accepted and presented at the conference will be invited for regular or special issues of reputable journals.

An international conference of this scale requires the support of many people. We would like to take this opportunity to thank all the members of the organizing committee, especially the Honorary Chairs Dr. Nobuyasu Kanekawa and Prof. Rajkumar Buyya; the Steering Chairs Prof. Jianhua Ma and Prof. Laurence Yang for their support, guidance, and their contribution to attracting high-quality papers. Thanks to all TPC members and reviewers for their valuable time and effort in reviewing the papers. We take this opportunity to thank also all the authors, participants and session chairs for their valuable efforts, many of whom need to travel long distances to attend this conference and make their valuable contributions. Thanks also go to the entire local arrangement committee members, including General Executive Chair Prof. Bernady O. Apduhan for the help in making the conference a wonderful success. Special thanks go to Dr. Kevin I-Kai Wang's team for the support to manage the conference webpage, paper submission, and so on, which facilitated the overall process.

It was our great honor and pleasure to accept the responsibilities and challenges of Conference General and Program Chairs/Cochairs. We trust that you will enjoy the academic program within DASC-2019, and at the same time that you will be able to see some of the surrounding natural beauty of the region. We look forward to seeing you at the IEEE DASC-2019 event.

Tadashi Dohi and Md Zakirul Alam Bhuiyan,  
*General Chairs of DASC 2019*

Tatsuhiro Tsuchiya,  
*Program Chair of DASC 2019*

Naohiro Hayashibara, Aniello Castiglione, and Zheng Zheng,  
*Program Co-chairs of DASC 2019*

## **Message from PCom 2019 Program Chairs and General Chairs**

It is our pleasure to welcome you all to the 17th IEEE International Conference on Pervasive Intelligent and Computing (PCom 2019). We are experiencing a moment in human history in which technological innovations occur at an unprecedented pace. Emerging technologies have the potential to change the way we live and interact among ourselves and with the environment. Computers have become ever smaller and all types of daily life objects are being instrumented with sensors and actuators able to monitor and act upon the physical environment. Beyond the ability to perceive phenomena in the real world, such objects are increasingly equipped with capabilities to process, reason over monitored data, detect and react to events, perform inferences, and generate useful knowledge, thus becoming smart objects. With the evolution of wireless technologies, these objects also become able to communicate with each other, with other real and virtual entities, and to cooperate for performing complex tasks. When an environment is broadly pervaded with smart objects, that is what we call pervasive intelligence.

Since its first edition in 2003, PCom has been established as a premier conference aiming to cover all dimensions of the intelligent paradigms as well as their applications in several pervasive computing domains. By covering the different visions and components of computational intelligence, including techniques and disciplines already well established, as well as emerging paradigms, PCom has a broad scope. PCom scope includes ubiquitous intelligence, social Intelligence, intelligent network, machine learning, big data, Internet of Things, cloud computing, context-aware computing, pervasive security, to name a few.

This year, we received many high-quality submissions from several parts of the world, which underwent a rigorous peer review process. At the end, 19 full papers and 7 posters were accepted to be presented at the main track of the conference. Besides the main track, this year PCom also includes two workshops on timely and very appealing subjects: the 1st International Workshop on Intelligence Big Data Processing Infrastructure and Its Applications and the 3rd IEEE International Workshop on Secure and Sustainable Computing and Communication Technologies for Smart Communities

To promote the dissemination of the high-quality work presented at PCom, we are delighted to inform that a selection of the best papers will be invited for regular or special issues of four reputable journals: IEEE Access, International Journal of Computer Sciences and Engineering, Journal of Information Science and Engineering, and CCF Transactions on Pervasive Computing and Interaction.

An international conference of this scale requires the support of many people. First, we would like to thank the Steering Chairs, Prof. Jianhua Ma, Prof. Laurence T. Yang and Prof. Adnan Al-Anbuky, for nourishing the conference and wisely guiding its course. Our heartfelt thanks to our General Executive Chairs, Professors Bernady Apduhan and Rossitza Marinova, for their efforts in organizing the conference. We are also indebted to our esteemed Track Chairs for efficiently guiding the review process with the invaluable help of the members of the program committee, who have put in hard work to review each paper in a professional way. Without their help, this program would not be possible. We are very grateful to the Chairs and organizers of the workshops, for providing another excellent forum for presentation and exchange of ideas. We appreciate the valuable help of our Publicity Chairs for disseminating the calls of our conference. Special thanks go to Kevin I-Kai Wang for his tireless and masterful work in managing several bureaucratic and infrastructure issues of the co-located events. Thanks to the local arrangement committee for their help in making the conference a success. We also thank all the authors, participants and session chairs for their valuable efforts. We are also grateful to IEEE for publishing the proceedings.

The 2019 edition of PCom is held in the beautiful Fukuoka City in the island of Kyushu, Japan. With a lot of attractions, excellent food, beautiful sea and mountains, Fukuoka has been selected as the world's most

livable cities every year. We hope that participants will enjoy the numerous local attractions, in addition to learning opportunities and academic and professional interactions.

Flavia C. Delicato and Sozo Inoue  
*General Chairs of PICom 2019*

Lidia Fuentes and Jane Hsu  
*Program Chairs of PICom 2019*

## **Message from CBDDCom 2019 Program Chairs and General Chairs**

On behalf of the Program Committee of the 5th IEEE International Conference on Cloud and Big Data Computing (CBDDCom 2019), we would like to welcome you to join the conference in Fukuoka, Japan, August 5-8, 2019.

The IEEE CBDDCom 2019 conference is a premier forum for researchers, practitioners, developers and users who are interested in cloud computing and big data to explore new ideas, techniques and tools, as well as to exchange experience. Besides the latest research achievements, this conference also covers innovative commercial data management systems, innovative commercial applications of cloud computing and big data technology, and experience in applying recent research advances to real-world problems. IEEE CBDDCom 2019 will be the fifth edition of the conference after the success of CBDDCom 2015 in Beijing, CBDDCom 2016 in Toulouse, CBDDCom 2017 in San Francisco, and CBDDCom 2018 in Guangzhou. It will continuously offer a platform for researchers to exchange novel studies, discuss important issues and explore key challenges in innovative cloud and big data for smarter world.

IEEE CBDDCom 2019 is co-located with IEEE PICom 2019, IEEE CyberSciTech, and IEEE DASC 2019. This year, IEEE CBDDCom received 34 submissions, covering a wide range of topics. Each paper was reviewed by at least three experts in the field. Finally, after the rigorous peer review process, 15 regular papers, 5 work-in-progress papers and 4 posters were accepted for oral presentation at the conference and publication in the conference proceedings.

An international conference of this scale requires the support of many people. We would like to take this opportunity to thank all the members of the organizing and steering committee, especially the Steering Chairs Prof. Jianhua Ma and Prof. Laurence Yang, for their great support and guidance in the preparation of the conference. Thanks also go to the entire local arrangement committee members, including General Executive Chair Bernady O. Apduhan. We thank also all reviewers for their valuable time and effort in reviewing the papers. Last, but not least, we thank all of the authors for their creative and worthwhile contributions which make the high quality of IEEE CBDDCom 2019. We hope you will enjoy the conference, and we wish you a pleasant stay in Fukuoka.

It was our great honor and pleasure to accept the responsibilities and challenges of Conference General and Program Chairs. We trust that you will enjoy the academic program of IEEE CBDDCom 2019, and at the same time that you will be able to see some of the surrounding natural beauty of the region. We look forward to seeing you at the IEEE CBDDCom 2019. Enjoy the conference, both technically and socially!

Anna Kobusinska, Poznan University of Technology, Poland

Peng Li, The University of Aizu, Japan

*General Chairs of CBDDCom 2019*

Shu Tao, IBM T. J. Watson Research Center, USA

Xiaoyan Wang, Ibaraki University, Japan

*Program Chairs of CBDDCom 2019*



## **AUG 5 (Day 1) 10:40–11:20 Keynote I**

### **Protection and use of biometric identity information –new possibilities for media security and privacy–**

*Isao ECHIZEN*

Deputy Director General / Professor, National Institute of Informatics (NII), JAPAN

[http://research.nii.ac.jp/~iechizen/official/members\\_echizen-e.html](http://research.nii.ac.jp/~iechizen/official/members_echizen-e.html)

**Abstract:** The growing presence of high-performance cameras and microphones throughout the everyday environment has enabled the remote acquisition of biometric identity information such as the face, voice, and gait and even fingerprints, veins, and iris that can be easily shared in cyberspace. This capability poses a threat in that it provides other means of “spoofing” biometric authentication systems in order to commit fraud. Measures must thus be taken to protect such systems against the misuse of biometric information. On the other hand, since biometric authentication has become widely used as a means of personal authentication, the provision of such biometric information at the time of authentication must be made as convenient as possible. This talk introduces the challenges faced regarding security and privacy against the acquisition of a person’s biometric identity information and the distribution of that information in cyberspace on the basis of that person’s wishes while maintaining the practical convenience of biometric authentication. It also describes fruitful demonstration testing using a prototype aimed at meeting these challenges.

**Biography:** Isao ECHIZEN received B.S., M.S., and D.E. degrees from the Tokyo Institute of Technology, Japan, in 1995, 1997, and 2003, respectively. He joined Hitachi, Ltd. in 1997, and until 2007 was a research engineer in the company’s systems development laboratory. He is currently a deputy director general of the National Institute of Informatics (NII), a professor and director of the Information and Society Research Division of NII, and a professor in the Department of Informatics, the School of Multidisciplinary Sciences, the Graduate University For Advanced Studies (SOKENDAI). He is also a visiting professor at Tsuda University and was a visiting professor at the University of Freiburg in 2010 and at the University of Halle-Wittenberg in 2011. His research has focused on information security and media security and privacy. He received the Best Paper Award from the IPSJ in 2005 and 2014, the Fujio Frontier Award and the Image Electronics Technology Award in 2010, the One of the Best Papers Award from the Information Security and Privacy Conference and the IPSJ Nagao Special Researcher Award in 2011, the Docomo Mobile Science Award in 2014, the Information Security Cultural Award in 2016, and the Best Paper Award at the IEEE WIFS 2017. He is a member of the Information Forensics and Security Technical Committee and the IEEE Signal Processing Society.



## AUG 5 (Day 1) 10:40–11:20 Keynote II

### Ranking and Scoring for Data Analytics and Combinatorial Fusion

*Frank Hsu*

Clavius Distinguished Professor / Director of Laboratory of Informatics  
and Data Mining, Fordham University, USA

[https://www.fordham.edu/info/25112/cis\\_faculty\\_and\\_administration/7484/frank\\_hsu](https://www.fordham.edu/info/25112/cis_faculty_and_administration/7484/frank_hsu)

**Abstract:** In the Cyber-Physical-Natural (CPN) ecosystem, everyone is an information user and an information provider. This level of complexity has produced ample opportunity but created many challenges for data analytics and model fusion. The situation in the big data era requires intricate experiments with more variables (cues, criteria, features, attributes, or indicators) and larger number of hypotheses. In a new data analytic paradigm, various ensemble methods combining multiple models or multiple machine learning algorithms are now frequently used to improve forecasting, prediction, and decision making. However, it remains to be a challenging problem as to when and how to combine these models or systems. This keynote presentation will cover the design of intelligent scoring systems and discuss when and how multiple scoring systems (MSS's) should be combined using rank-score characteristic (RSC) function and cognitive diversity (CD). We illustrate methods and practices of this new paradigm in cyber science and technology with diverse examples ranging from figure skating judgement to drug discovery virtual screening (VS), from evidence review in e-discovery to intrusion detection in cybersecurity, and from network selection in wireless communication to multi-layer combinational fusion in deep learning.

**Biography:** D. Frank Hsu is the Clavius Distinguished Professor of Science, a professor of Computer and Information Science, and director of the Laboratory of Informatics and Data Mining at Fordham University in New York, USA. He was chair of the CIS Department and associate dean of the Graduate School of Arts and Sciences. He held visiting positions at JAIST, Keio University, MIT, Taiwan University, and University of Paris-Sud. Hsu's main research interests are: interconnection networks, graph database, micro- and macro-informatics, data science, and ensemble method; combinatorial fusion algorithm (CFA) with domain applications in STEM, computational social science, cognitive neuroscience, business, finance, and joint decision making. He has co-authored/co-edited 40 books and book chapters and published over 200 technical papers in journals and conference proceedings. Hsu is chair of New York Chapter of IEEE CIS Society and on ExCom of IEEE New York Section. He has been steering committee co-chair for the conference series I-SPAN. He has given over 400 presentations worldwide. Hsu served on many editorial boards including IEEE Transactions on Computers and IEEE Transactions on Reliability. He is on several editorial boards including IEEE Systems Journal, Brain Informatics, and Journal of Interconnection Networks. Among the honors and awards he received are IEEE-AINA Conference Best Paper Award, Foundation Fellow of the Institute of Combinatorics and Applications (ICA), Fellow of the Institute of Cognitive Informatics and Cognitive Computing (ICIC), Fellow of the New York Academy of Sciences (NYAS), and IBM Faculty Award. Hsu received his M.S. from the University of Texas at El Paso and Ph.D. from the University of Michigan. He is a Senior member of the IEEE.



## **AUG 6 (Day 2) 13:30-14:10 Keynote III**

### **Computational Behaviour Analysis for Cyber-Physical Systems within Smart World Development**

*Liming (Luke) CHEN*

Professor, De Montfort University, UK

<https://www.dmu.ac.uk/about-dmu/academic-staff/technology/liming-chen/liming-chen.aspx>

**Abstract:** We are living in an increasingly smarter world where we do business, communicate and recreate among and across physical, cyber, social and mental spaces. Cyber-physical systems (CPS) offers mechanisms, technologies and tools which integrate and interweave physical entities, e.g. the internet of things, smart objects and devices and embedded systems, cyber entities, e.g. apps, social software and algorithms, and mental machinery, to support and facilitate cross-space multi-modal interactions and functionalities. The challenge is how smart CPSs should or can be in order to meet varying needs of different cohorts of users, and one of the core enabling technologies is computational behaviour analysis which can discover individual users' ways of performing tasks, thus supporting advanced features, such as adaptation, personalisation and decision-making recommendation. In this talk the speaker will characterise the smart world concepts, and examine closely the research issues, methodologies and approaches to computational behaviour analysis which underpin the new wave smart cyber-physical systems. After this he will present his recent research and initial results in e-learning, healthcare and social network analysis describing the latest behaviour modelling and analysis technologies. He will then discuss research challenges and future directions which are aimed at stimulating and enlightening new ideas and approaches in this emerging research area.

**Biography:** Liming (Luke) Chen is Professor of Computer Science in the School of Computer Science and Informatics, De Montfort University, UK. He received his BEng and MEng from Beijing Institute of Technology (BIT), China, and his Ph.D in Artificial Intelligence from De Montfort University, UK. His current research interests include data analytics, pervasive computing, artificial intelligence, user-centred intelligent systems and their applications in smart healthcare. Liming is an IET Fellow, an IEEE Senior Member, a co-founder and co-director of the UK-China Gait and Health Innovation Institute, the DMU-USTB (University of Science and Technology Beijing, China) Joint Research Lab. on Smart Healthcare, and the IEEE CIS "User-centred Smart Systems" Task Force. He is currently the coordinator of the EU Horizon2020 MSCA ITN ACROSSING project, and has served as the principal investigator for the EU AAL PIA project, the MobileSage project and FP7 MICHELANGELO project, and a number of projects funded by industry and third countries. Liming has over 200 publications in internationally recognised journals, book series and conferences. He is the general chair or program chair for IEEE Smart World Congress 2019, IEEE UIC2017, IEEE HealthCom2017, SAI Computing 2017, IEEE UIC2016, IntelliSys2016, MoMM2015/2014/2013, SAI2015/2013, IWAAL2014, UCAMI2013, and an organising chair of many workshops such as Romart-City2016 and SAGAAware2015/2012, associate editor of IEEE THMS, assistant EIC for IJPC and guest editors for IEEE THMS, PMC and IJDSN. He has delivered over 20 talks, keynotes and seminars in various forums, conferences, industry and academic events.





## **AUG 6 (Day 2) 14:10–14:50 Keynote IV**

### **On Liquid Software and the Programmable World**

*Cesare PAUTASSO*

Professor, University of Lugano (USI), SWITZERLAND

<http://www.pautasso.info>

**Abstract:** Service-oriented computing has profoundly affected the personal computing experience. Users no longer run every application and store their data on a single computer. Instead they own and operate a complex multi-device ensemble made of desktop computers, laptops, tablets, phones, watches, glasses, cars, or any sort of internet-connected thing to manage their personal information and accomplish their tasks by accessing software delivered as a service. Many approaches to achieve a liquid user experience whereby data and software can seamlessly flow and adapt across smart devices are starting to appear within proprietary platforms relying on centralized solutions, where data is conveniently stored in the Cloud, outside the control of the users producing and consuming it. In this talk we discuss how the open Web currently undergoing a re-decentralization might still play an important role within a programmable smart world.

**Biography:** Cesare Pautasso is full professor at the Software Institute of the Faculty of Informatics at the University of Lugano, Switzerland. Previously he was a researcher at the IBM Zurich Research Lab and a senior researcher at ETH Zurich. He completed his graduate studies with a Ph.D. from ETH Zurich in 2004. His research group focuses on building experimental systems to explore the intersection of Software Architecture, Web Engineering and Business Process Management with research projects on liquid software, RESTful conversation mining, microservice performance benchmarking, and interactive Web presentations. He was the general chair of the ICWE 2016 and ECOWS 2011, program co-chair of ICSOC 2013, ECOWS 2010 and Software Composition 2008. He has also started the series of International Workshops on RESTful Design (WS-REST) at the WWW conference. He is co-editor of the IEEE Software Insights department. He has co-authored a book on SOA with REST: Principles, Patterns & Constraints for Building Enterprise Solutions with REST in 2012 and is currently finishing another titled "Just Send An Email: Anti-Patterns for email-centric organizations" available on Leanpub. You can find more details on <http://www.pautasso.info> and follow him [@pautasso@scholar.social](https://twitter.com/pautasso)



## **AUG 6 (Day 2) 14:50–15:30 Keynote V**

### **Autonomic Computing for self-improving dependability in Large-Scale Computing System**

*Yuanshun DAI*

Dean of School of Cybersecurity / Professor, University of Electronic Science and Technology of China, CHINA

<http://faculty.uestc.edu.cn/daiyuanshun>

**Abstract:** In Large Scale Computing System (LSCS), there is a critical and challenging issue: it is almost impossible for humans to manually diagnose/recover/defend numerous faults/failures/threats/attacks of a great number of distributed components in a timely manner due to the large scale. The work presented integration of Artificial Intelligence into dependability issues of LSNS. It proposed a prototype technology to self-improve the reliability for LSNS to enable a LSCS self-learning capability. The model systematically built the architecture of BANS (Bionic Autonomic Nervous System) that is a kind of nature-inspired technology. The BANS architecture implemented cyber-neurons/axons/peripheral nerves/central nerves, and the AI algorithms embedded in the BANS combined Neural Network, Fuzzy Logic, and Multi-value Diagrams for supervised machine-learning and reinforcement self-learning. This innovative technology enabled LSCS the capability of self-diagnosis and self-healing functions.

**Biography:** Dr. Dai is Professor of University of Electronics Science and Technology of China (UESTC), and Dean of School of Cybersecurity at UESTC. Dr. Dai's research mainly focuses on Reliability Modeling and Optimization for Large-Scale Networking Systems (LSNS). He has published about 200 articles, where there are 4 books, 128 journal papers including 56 IEEE/ACM Transactions papers, and 40 conference papers including 2 Best Paper Awards. According to Google Scholar, Dr. Dai's papers are cited by others 4452 times and his h-index is 38 and i10-index is 88. Dr. Dai is continuously elected as "Chinese Most Cited Researchers" by Elsevier since 2015 every year till now, and was ranked No. 2 in 2017 in China in the field of "Safety, Risk, Reliability and Quality". He is currently serving as the Associate Editor for IEEE Transactions on Reliability. Dr. Dai was also invited as Keynote Speakers for IEEE ISORC'05, ChinaSoft'11, ICCT'12 and iThings'16 etc.

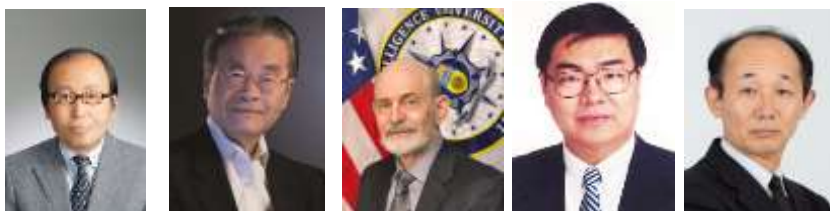
*The IEEE 2019 CyberSciTech/DASC/PICom/CBDCom Joint Panel on***The Future Direction of Cybersecurity Research**

Kyushu Sangyo University, Fukuoka, Japan, August 6, 2019

Latest landscape of cyberattacks can be characterized with the diversification of attack methods using malwares such as targeted attacks, DoS attacks, Drive-by-Download, and with the variety of the attack targets such as governments, CII (automobiles, control systems etc.), companies, IoT devices. In addition, with the advent of new services/applications (e.g. IoT, Cloud, 5G) and technologies (e.g. Fintech, BlockChain), the attackers are able to expand the attack targets and upgrade/improve the attack methods.

In order to protect our valuable assets and systems from cyber threats and attacks, with comprehensive consideration through academia, governments, important infrastructures, enterprises and individuals, innovative and challenging cybersecurity measures are expected to be urgently and effectively researched and developed. In such a diverse and rapidly changing environment including increase of attack surfaces, this panel aims at providing an academic roundtable among world-class experts for scholars to brain storming, exchange new ideas and innovative technologies, and even undertake joint research studies about cybersecurity research. The topics include but not limited to:

- 1) Observation of Cyber Threats and Attacks - Events Collections
- 2) Emerging, Promising and Challenging Cybersecurity Technologies
- 3) Observation of Cyber Threats and Attacks
- 4) Big data Analysis for Cybersecurity
- 5) How to share and distribute for Cybersecurity
- 6) How to collaborate and jointly study on Cybersecurity
- 7) How to settle and establish Cybersecurity Policy and Strategy for Research

**Panel Chair & Moderator**

**Koji Nakao**, National Institute of Information and Communications Technology, Japan

**Panelists**

**Stephen S. Yau**, Professor, Arizona State University, USA

**Michael David**, Professor, The National Intelligence University, USA

**Zhong Chen**, Professor, Peking University, China

**Masato Tedara**, Professor, Tokyo Denki University, Japan

**13:00 – 15:00 CyberSciTech Session 1: Cyberspace Theory & Technology****Chairs: TBA**

1. A Spark-based Approach for High-efficiency Embedded Feature Selection, Fan Zhou; Zhongyang Han; J. Zhao; W. Wang
2. A New Evolutionary Algorithm Based on Self-adaptive Grouping and Efficient Resource Allocation, Sen Liu; Liwen Liu; Xuyan Liu; Yuping Wang; Baoming Bai
3. Two-layer Group Signature and Application to E-cash, Hanwen Feng; Jianwei Liu; Qianhong Wu, Tongge Xu
4. Study on Quantization Decision Algorithm for Feature Matching of Turf Grass Introducing, Linjing Wei; Wenke Dong; Yangping Wang; Shirun Gan
5. Text Detection on Books Using CNN Trained with Another Domain Data, Riku Anegawa; Masayoshi Aritsugi
6. A Knowledge-based Multiplayer Collaborative Routing in Opportunistic Networks, Xiaoheng Deng; Huan Chen; Ruting Cai; Feng Zeng; Guangquan Xu; Honggang Zhang

**15:20 – 17:00 CyberSciTech Session 2: Cyber Security, Privacy & Trust****Chair: TBA**

1. Consistent Offline Update of Suspended Virtual Machines in Clouds, Kenichi Kourai; Yuji Shiota
2. A Pseudonym Certificate Management Scheme Based on Blockchain for Internet of Vehicles, Shihan Bao; Ao Lei; Haitham Cruickshank; Zhili Sun; Philip Asuquo; Waleed Hathal
3. Searchable Encryption Using Secret-Sharing Scheme for Multiple Keyword Search Using Conjunctive and Disjunctive Searching, Ahmad Akmal Aminuddin Mohd Kamal; Keiichi Iwamura
4. C3-Sex: a Chatbot to Chase Cyber perverts, Daniel Diaz; Jossie Esteban Murcia; Félix Gómez Mármol; Sebastian Moreno Rodriguez
5. Privacy-preserving Deep Learning Models for Law Big Data Feature Learning, Xu Yuan; Jianing Zhang; Zhikui Chen; Jing Gao; Peng Li

**13:00 – 15:00 PCom Session 1: Computational intelligence****Chair: Nicolas Tsapatsoulis**

1. Generative Model for Probabilistic Inference, Yi Liu; Yunchun LI; Honggang Zhou; Hailong Yang; Wei Li
2. A Denoising Framework for Image Caption, Yulong Zhang; YX Ding; Rui Wu; Fuxing Xue
3. Improved Medical Image Segmentation Algorithm Using Two-step CNN Architecture, Migyung Cho; Uram Ko; Hyekyung Lee; Hwan-Gue Cho
4. Superposition of dual image fusion with improved dehazing methods for high visibility of underwater image, Ahmad Shahrizan Abdul Ghani; Ahmad Fakhri Ab. Nasir
5. Composite Gaussian Distribution Modeling of Mobility Prediction Accuracy for Wireless Users, Lu Liu; Wuyang Zhou; Sihai Zhang; Wei Cai
6. Regression Training using Model Parallelism in a Distributed Cloud, Joel Reijonen; Miljenko Opsenica; Roberto Morabito; Miika K.T. Komu; Mohammed Salem Elmusrati

**15:20 – 17:00 PCom Session 2: Activity Recognition and Ubiquitous Systems****Chair: Md. Atiqur Rahman Ahad**

1. Context-Aware Voice-based Interaction in Smart Home - VocADom@A4H Corpus collection and empirical assessment of its usefulness, François Portet; Sybille Caffiau; Fabien Ringeval; Michel Vacher; Nicola Bonnefond; Solange Rossato; Benjamin Lecouteux; Thierry Desot
2. Lightweight Polygonal Approximation-based ECG Signal Processing Platform, Daejin Park; Junho Kwak; Jeonghun Cho; SeungMin Lee
3. Automatic localization of Passive Infra-red binary sensors in home: from dense to scattered network, Nathavuth Kitbutrawat; François Portet; Hirozumi Yamaguchi; Teruo Higashino
4. Evaluation of Transfer Learning for Human Activity Recognition among Different Datasets, Md Shafiqul Islam; Tsuyoshii Okita; Sozo Inoue
5. Achieving Accurate Ubiquitous Sleep Sensing with Consumer Wearable Activity Wristbands using Multi-class Imbalanced Classification, Zilu Liang; Mario Alberto Chapa Martell

**13:00 – 15:00 DASC Session 1: Dependability and security for hardware, software and data****Chair: TBA**

1. Stuck-at Fault Resilience using Redundant Transistor Logic Gates, Richard McWilliam; Philipp Schiefer; Alan Purvis; Samir Khan
2. Low-cost and Fast Failure Recovery Using In-VM Containers in Clouds, Tomonori Morikawa; Kenichi Kourai
3. Privacy-enabled Recommendations for Software Vulnerabilities, Linus Karlsson; Nicolae Paladi
4. Distributed Data Anonymization, Mina Sheikhalishahi
5. Identifying Data Exposure across Distributed High-Dimensional Health Data Silos through Bayesian Networks optimised by Multigrid and Manifold, Nikolai J Podlesny; Anne Kayem; Christoph Meinel

**15:20 – 17:00 DASC Session 2: Emerging applications of secure and dependable computing****Chair: TBA**

1. Keep Rogue IoT Away: IoT Detector based on Diversified TLS Negotiation, Chih-Wen Ou; Fu-hau Hsu, Chia-Min Lai
2. IoT based Hybrid Green Energy Driven Highway lighting System, Md Arafatur Arafatur Rahman; Marufa Y. Mukta; Abu Yousuf; A. Taufiq Asyhari; Md. Zakirul Alam Bhuiyan; Che Yahaya Yaakub
3. A Novel Blockchain Scheme Combining Prime Numbers and Iris for Encrypting Coding, Iovane Gerardo; Barra Silvio; Castiglione Aniello; Chinnici Marta; Nappi Michele; Petrosino Alfredo
4. Towards A Privacy-Preserving Voting System Through Blockchain Technologies, Rabeya Bosri; Abdur Razzak Uzzal; Abdullah Al Omar; A S M Touhidul Hasan; Md Zakirul Alam Bhuiyan
5. Analysis of Community in social networks based on Game theory, Flora Amato; Aniello Castiglione; Vincenzo Moscato; Giancarlo Sperli

**13:00 – 15:00 CBDCom Session 1: Cloud Computing and IoT****Chair: Frank Hsu**

1. A Page Cache Management Scheme in Cloud Computing Environments, Hsung-Pin Chang; Chien-Neng Liao; Da-Wei Chang
2. Dynamic Controller-Switch Mapping Assignment with Genetic Algorithm for Multi-Controller SDN, Biao Han; Xiangrui Yang; Xiaoyan Wang
3. A Programming Environment for Visual IoT on Raspberry Pi, Ken T. Murata; Praphan Pavarangkoon; Somnuk Phon-Amnuaisuk; Takamichi Mizuhara; Kazunori Yamamoto; Kazuya Muranaga; Toshiki Aoki
4. Predicting Food POI attractions for Smart Business using Passenger Commuting Patterns, Syed Muhammad Asim Ali Rizvi; Weifeng Lv; Bowen Du; Haiquan Wang; Runhe Huang
5. Age of Information-Aware Multi-Tenant Resource Orchestration in Network Slicing, Xianfu Chen; Celimuge Wu; Tao Chen; Nan Wu; Honggang Zhang; Yusheng Ji
6. Bis: A Novel Blockchain based Bank-tax Interaction System in Smart City, Zhihui Lu; Xiaoli Wan; Jian Yang; Jie Wu; Cheng Zhang; Patrick C. K. Hung; Shih-Chia Huang

**15:20 – 17:00 CBDCom Session 2: Data Science and Analytics****Chair: Xiaoyan Wang**

1. Utilizing Latent Posting Style for Authorship Attribution on Short Texts, Patamawadee Leepaisomboon; Mizuho Iwaihara
2. Evaluating The Performance of Machine Learning Sentiment Analysis Algorithms in Software Engineering, Omair Shafiq
3. Hybrid Machine Learning Approach For Electric Load Forecasting, Jui-Chieh Kao; Chun-Chih Lo; Chin-Shiuh Shieh; Yu-Cheng Liao; Jun-Wei Liu; Mong-Fong Horng
4. Consumer Segmentation: Improving Energy Demand Management through Households Socio-Analytics, Shailendra Singh; Yassine Abdulsalam; Rachid Benlamri
5. Gold Price Forecast based on LSTM-CNN Model, Zhanhong He; Junhao Zhou; Hong-Ning Dai; Hao Wang

**09:00 – 10:20 CyberSciTech Session 3: Cyber Physical Computing & Systems****Chair: TBA**

1. IoT nodes equipment selection based on MADM: A case study of groundwater quality detection equipment, Wei He; Jing Wang; Beng Wu; Hui Luan; Hua-qing Liang; Chong Chen
2. A Home-based IoT-enabled Framework for Sleep Behaviour Assessment, Sarah Fallmann; Liming Luke Chen; Feng Chen
3. Deep Learning Technology for Chiller Faults Diagnosis, Ke Yan; Jun Hua
4. Research on Temporary Building Monitoring of Railway Construction Based on Remote Sensing Image, Yangping Wang

**10:40 – 12:00 CyberSciTech Session 4: Cyber Social Computing & Networks****Chair: TBA**

1. The central community of Twitter ego-networks as a means for fake influencer detection, Nicolas Tsapatsoulis; Vasiliki Anastasopoulou; Klimis Ntalianis
2. Towards Integrative Personal Character Modeling Using Multi-Level Fusion across Scenarios and Periods, Ao Guo; Jianhua Ma
3. Hybrid Collaborative Filtering with Semi-Stacked Denoising Autoencoders for Recommendation, Hairui Zou; Chaoxian Chen; Changjian Zhao; Bo Yang; Zhongfeng Kang
4. Many-to-Many Collaborator Recommendation Based on Matching Markets Theory, Xiangjie Kong; Linyan Wen; Jing Ren; Mingliang Hou; Minghao Zhang; Kang Liu; Feng Xia



**09:00 – 10:20 PICom Session 3: Intelligent Middleware and Applications****Chair: Claudio Miceli**

1. A Novel Algorithm for Efficient Labeling and Its Application to On-Road Risk Detection, Yixin Hu; Zhao Qiangfu; Yoichi Tomioka
2. Exploiting Spatial Locality for Content Placement in Roadside-Unit Caching with Delay Constraint, Sok-Ian Sou; Ciao-Ling Lou; Yinman Lee
3. Bringing 5G Into User's Smart Home, Bruno Dzogovic; Bernardo de Matos Patrocínio dos Santos; Thanh van Do; van Thuan Do; Boning Feng; Niels Jacot
4. Intelligence Stratum for IoT. Architecture Requirements and Functions, Edgar J Ramos; Roberto Morabito

**10:40 – 12:00 PICom Session 4: Pervasive and Embedded Computing****Chair: Sozo Inoue**

1. Hardware-Accelerated Similarity Search with Multi-Index Hashing, Leandro Santiago de Araújo; Victor Cruz Ferreira; Brunno Figueroa Goldstein; Alexandre Solon Nery; Leandro Augusto Justen Marzulo; Sandip Kundu; Felipe M. G. França
2. WiTrack: Human-to-Human Mobility Relationship Tracking in Indoor Environments Based on spatio-temporal Wireless Signal Strength, Ting-Han Chen; Sok-Ian Sou; Yinman
3. Camera-in-Hand Robotic Arm Using a Deep Neural Network to Realize Unmanned Store Service, Oskal T.-C. Chen; Yu Cheng Zhang; Zheng Kuan Lin; Pei-I Kuo; Yi Lun Lee
4. A density-based decision-making data fusion method for multiapplication wireless sensor networks, Claudio M. Farias; Flávia Coimbra Delicato; Giancarlo Fortino

**09:00 – 10:20 DASC WiP Session****Chair: TBA**

1. Reconfigurable Fault-Safe Processor Platform Based on RISC-V for Large-Scaled IoT-Driven Applications, Daejin Park; Hyeon-Gyun Moon; Jeonghun Cho
2. SMT-Based Bounded Model Checking of Embedded Assembly Program with Interruptions, Kosuke Uemura; Satoshi Yamane
3. TraceFilter: An Exploitability Analyzer of Vulnerabilities in Binary Code, Eun-Sun Cho; Seong-Kyun Mok
4. Towards Enabling Autonomic Computing in IoT Ecosystem, Mohammad Tahir; Qazi Mamoon Ashraf; Mohammad Dabbagh
5. HiMessage: An interactive voice mail system with the humanoid robot, Pepper Carmen Bisogni; Paola Barra; Antonio Rapuano; Andrea F. Abate; Gerardo Iovane

**10:40 – 12:00 Workshop on Intelligence Big Data Processing Infrastructure and Its Applications****Chair: TBA**

1. Information entropy differential privacy : Differential privacy protection data publishing method based on rough set theory, Xianxian Li, Chunfeng Luo, Peng Liu, Li-e Wang
2. Improved SLAM Merged 2D and 3D Sensors for Mobile Robots, Hanghang Deng; Qiang Wang; Jingtao Sun
3. Combinatorial properties of multimedia IPP codes of length 2, Jing Jiang; Chengyao Zhao; Minquan Cheng; Hongyan Dong
4. Symmetric and Positive splitting iteration for space fractional diffusion equation, Zhixuan Huang
5. A Threshold-based Visual Odometry in a Composite Environment Using Edges and Points, Shuxuan Lu; Qiang Wang; Jingtao Sun

**09:00 – 10:20 CBDCom Session 3: Big Data and Applications****Chair: Emi Yuda**

1. L-DAG: Enabling Loopy Workflow in Scientific Application with Automatic DAG Transformation, Xin You; Hailong Yang; Zhongzhi Luan; Depei Qian
2. Base Station Allocation for Users with Overlapping Coverage in Wirelessly Networked Disaster Areas, Yu Wang; Michael C Meyer; Junbo Wang
3. Multi-factor Based Stock Price Prediction Using Hybrid Neural Networks with Attention Mechanism, Chen Li; Xu Zhang; Mahboob Qaosar; Saleh Ahmed; Kazi Md. Rokibul Alam; Yasuhiko Morimoto
4. The Comparison and Verification of Some Efficient Packet Capture and Processing Technologies, Jiaqian Li; Chengrong Wu; Jiawei Ye; Jiong Ding; Qinwei Fu; Jiatao Huang

**10:40 – 12:00 CBDCom WiP Session****Chair: TBA**

1. LoRa Communication Maps of Medium-Sized Rural City in Japan via Community Bus Services, Ken T. Murata; Kohei Mizutani; Yoshiaki Muroyama; Kazunori Yamamoto; Kazuya Muranaga; Takamichi Mizuhara; Praphan Pavarangkoon; Kazuki Kobayashi
2. Big data analytics for personalized recommendation systems, Carson K. Leung
3. Sentiment Analysis on Tweets Using Machine Learning and Combinatorial Fusion, James Ho; Frank Hsu; Dominik Ondusko; Brandon Roy
4. Traffic Flow Prediction with Compact Neural Networks, Yuhang Li; Celimuge Wu; Tsutomu Yoshinaga; Yusheng Ji
5. Adaptive Confidence Evaluation Scheme for Periodic Activity Recognition in Smart Home Environments, Yi-en Tan; Chun-Chih Lo; Chin-Shiuh Shieh; Denis Miu; Mong-Fong Horng

**09:00 – 10:20 CyberSciTech WiP Session 1: Cyber Security, Privacy & Trust 1****Chair:**

1. Location Privacy Protection Method based on a Proxy in Un-trusted Mobile Social Networks, Bidi Ying; Amiya Nayak
2. FalcoEye: A High-performance Distributed Security Scanning System, Cheng Wang; Xiaokang Zhou; Dong Lv; Xin Liu; Rui Zhou; Qingquan Lv; Mingsong Wang
3. Reengineering Cyber Security Process: A New Perspective on Cyber Security Quality Management, Mehrdad S Sharbaf
4. A Sequential Scheme for Detecting Cyber Attacks in IoT Environment, Yan Naung Soe
5. Security and Trust Issues on Digital Supply Chain, Haibo Zhang; Toru Nakamura; Kouichi Sakurai

**10:40 – 12:00 CyberSciTech WiP Session 2: Cyber Security, Privacy & Trust 2****Chair:**

1. Traceable Decentralized Anonymous E-cash System Against Active Attackers, Hanwen Feng; Jianwei Liu; Qianhong Wu, Tongge Xu
2. Practical Key Recovery Model for Self-Sovereign Digital Wallets - Work In Progress, Reza Soltani; Uyen Trang Nguyen; Aijun An
3. Power of Communication behind Extreme Cybersecurity Incidents, Masato Kikuchi; Takao Okubo
4. A Method for Cloud-Assisted Secure Wireless Grouping of Client Devices at Network Edge, Marat Zhanikeev
5. Applying SMOTE for a Sequential Classifiers Combination Method to Improve the Performance of Intrusion Detection System, Sornxayya Phetlasy, Satoshi Ohzahata, Celimuge Wu, Toshihito Kato

**12:00 – 13:25 CyberSciTech/PICom/DASC/CBDCom Poster Session****Chair:**

1. A proposal of music-based personal authentication system, Shusei Narumi; Mitsuharu Matsumoto
2. Policy Management Technique Using Blockchain for Cloud VM Migration, Toshihiro Uchibayashi; Bernady Apduhan; Norio Shiratori; Takuo Suganuma; Masahiro Hiji
3. Semantic Model for Creating an Instance of IoT/IoE, Radmila Juric
4. The Implementation of Wireless Industrial Internet of Things (IIoT) Based upon IEEE 802.15.4-2015 TSCH Access Mode, Ho-Ting Wu; Kai-Wei Ke; Song-Ferng Wang; Po-Hung Chen; Guan-De Lee; Chen-Yu Tseng; Chen-Yu Ho
5. A Method of Classifying Japanese Sign Language using Gathered Image Generation and Convolutional Neural Networks, Shin-ichi Ito; Momoyo Ito; Minoru Fukumi
6. Diffusion Kernel based Mobility Prediction for Wireless Users, Lu Liu; Sihai Zhang; Wuyang Zhou; Wei Cai; Qimei Cui
7. Optimal Resource Reservation Scheme for Maximizing Profit of Service Providers in Edge Computing Federation, Yuan-sheng Luo; Shi Qiu
8. Metro Passenger and Freight Transport: A Framework for Underground Logistics System, Yiming He; Qiang Wang; Hailong Chen; Chuanqi Gao
9. Extensible On-Body Smartphone Localization: A Project Overview and Preliminary Experiment, Mitsuaki Saito; Kaori Fujinami
10. A Framework for Human-centric Personalization of Context Recognition Models on Mobile Devices, Kaori Fujinami; Trang Vu; Koji Sato
11. Internet of Things in Agriculture: a Decision Support System for Precision Farming, Lambros Lambrinos
12. A Framework of Page Synchronization for Adaptable Virtual Machine Live Migration, Cho-Chin Lin; Wei Ping Goh; Shyi-Tsong Wu
13. Performance Improvement of High-Speed File Transfer over JHPCN, Praphan Pavarangkoon; Ken T. Murata; Kazunori Yamamoto; Kazuya Muranaga; Takamichi Mizuhara; Keiichiro Fukazawa; Ryusuke Egawa; Takahiro Katagiri; Masao Ogino; Takeshi Nanri
14. A Tensor Model for Quality Analysis in Industrial Drinking Water Supply System, Di Wu; Hao Wang; Razak Seidu
15. Dynamic Replication Scheduling for Cloud Datacenters Based On Workload Statistics, Yu-Ju Chen; Wan-Chi Chang; Pi-Chung Wang

**09:00 – 10:20 CyberSciTech WiP Session 3: Cyberspace Theory & Technology****Chair:**

1. A review of issues and challenges in fog computing environment, Chenlei Liu; Feng Xiang; Pan Wang; Zhixin Sun
2. A Distributed Video Analytics Architecture based on Edge-Computing and Federated Learning, Abdelkarim Ben Sada; Mohammed Amine Bouras; Jianhua Ma; Runhe Huang; Huansheng Ning
3. A Novel Strategy for Barrier Confident Information Coverage in Sensor Networks, Yalan Jiang; Lingzhi Yi; Lu Zhu; Zhenkun Jin; Xianjun Deng; Minghua Wang
4. Minimizing Energy for Caching Resource Allocation in Information Centric Networking with Mobile Edge Computing, Yayuan Tang
5. Mining Key Scholars via Collapsed Core, Shuo Yu; Yuanhu Liu; Jing Ren; Hayat Dino Bedru; Teshome Megersa Bekele; Liangtian Wan; Feng Xia

**10:40 – 12:00 CyberSciTech WiP Session 4: Cyber Physical Computing & Systems****Chair:**

1. An Assistive Augmented Reality-based Smartglasses Solution for Individuals with Autism Spectrum Disorder, Eduardo Machado; Liming Luke Chen; David Saldaña; Ivan Carrillo
2. Computational Model for Wearable Hardware Commodities, Karoline McClenaghan; Ole Christian Moholth
3. CPG-FS: A CPU Performance Graph Based Device Fingerprint Scheme for Devices Identification and Authentication, Shiquan Dong; Fadi Farha; Shan Cui; Jianhua Ma; Huansheng Ning
4. Industrial Control Network Security Analysis and Decision-making by Reasoning Method Based on Strong Relevant Logic, Hongbiao Gao; Jianbin Li; Jingde Cheng
5. ICA Based EEG Feature Analysis and Classification of Learning Styles, Khawla Alhasan; Suleiman Aliyu; Liming Luke Chen; Feng Chen

**13:00 – 15:00 CyberSciTech Session 5: Cyber Intelligence & Cognitive Science****Chair:**

1. KID Model Realization using Memory Networks for Text-based Q/A Analyses and Learning, Jiandong Li; Runhe Huang; Kevin I-Kai Wang; Jiannong Cao
2. Engagement detection in e-learning environments using convolutional neural networks, Mahbub Murshed; M. Ali Akber Dewan; Fuhua Lin; Dunwei (Grant) Wen
3. Multi-trait Selection Model of Dairy Cow Based on the Mixed Leapfrog Algorithm, Linjing Wei; Wenke Dong; Yangping Wang; Shirun Gan
4. Pop-up Recommended Illustrations for E-book Readers Using Text Analysis Techniques, Masato Shimokubo; Kevin I-Kai Wang; Runhe Huang
5. Research on vehicle routing problem with time windows based on the Dragonfly Algorithm, Chenlei Liu; Wenhan Tao; Chencong Zhao; Xinwan Li; Yaning Su; Zhixin Sun
6. Prediction of Stock Prices with Sentiment Fusion and SVM Granger Causality, King Ma; Henry Leung; Jintak Park

## **15:20 – 17:00 CyberSciTech Session 6: Cyber Life & Wellbeing**

### **Chair:**

1. Analysis and Prediction of Differential Parking Behaviors, Lai Tu; Zhen Ma; Benxiong Huang
2. A design of high-performance streetlights management system, Sheng BI; Min Dong; Boyu Sun; Kaihong Yang
3. Visualization Design Based on Personal Health Data and Persona Analysis, Zhi Li; Qun Jin
4. Culture-based Color Influence Paths Analysis by Using Eye-tracking Devices, BO WU; Shoji Nishimura; Qun Jin; Yishui Zhu
5. Study on the Matching Algorithm of Turf Grass Introduction Features Based on Big Data Analysis, Linjing Wei; Wenke Dong; Shirun Gan; Yangping Wang

**09:00 – 10:20 Workshop on Secure and Sustainable Computing and Communication Technologies for Smart Communities****Chair:**

1. The extraction of key distinct features for identification and classification of helicopters using Micro-Doppler Signatures, Vikas Agnihotri; Munish Sabharwal; Vinay Goyal
2. Rate Maximization for Cell-Free Massive MIMO with Low-Resolution ADCs, Yao Zhang; Haotong Cao; Meng Zhou; Shengchen Wu; Longxiang Yang
3. Blockchain as a Service for Software Defined Networks: A Denial of Service Attack Perspective, Arnab Bose; Gagangeet Singh Aujla; Maninderpal Singh; Neeraj Kumar; Haotong Cao
4. Software Defined UAV-based Location Aware Deployment Scheme for Optimal Wireless Coverage, Sahil Vashisht; Sushma Jain; Ravinder Mann
5. IPTV Video Hardware Encryption Transmission System Analysis, Qin Wang; Feng Zhang

**10:40 – 12:00 CyberSciTech WiP Session 5: Cyber Intelligence & Cognitive Science****Chair:**

1. Product Surface Defect Detection Based on CNN Ensemble with Rejection, Kai Su; Zhao Qiangfu; Po Chun Lien
2. Evaluation Approach Based upon Knowledge Delivery Process in Smart Teaching Environment, Chengxin Zhang, Huiquan Zhang, Di He, Fei Hao
3. An Incremental Broad Learning Approach for Semi-Supervised Classification, Xize Liu, Tie Qiu, Chen Chen, Huansheng Ning, Ning Chen
4. Data Mining and Machine Learning Applications for Educational Big Data in the University, Keisuke Abe
5. Online Ventricular Segmentation System Based on Machine Learning, Yilin Hu, Hang Yin, Binbin Yong, Yunshan Cao, Xing Zhou, Rui Zhou, Qingquan Lv, Mingsong Wang

**13:00 – 15:00 Workshop on Healthcare with Intelligent Sensing, System, and Data****Chair: Wasim Ahmad**

1. Emotion Recognition from Speech to Improve Human-Robot Interaction, Wasim Ahmad; Changrui Zhu
2. Energy-Efficient Signal Processors with Silent Mirror Tracer for Long-Term Activity Monitoring, Daejin Park; Jaeyong Jung; Jeonghun Cho
3. Hand Gesture Detection based Real-time American Sign Language Letters Recognition using Support Vector Machine, Wasim Ahmad; Xinyun Jiang
4. Health Activities Monitoring and Warning System for Geriatric Daily Living in Extra Care Homes, Hua Li; Cheng Yang; Zhilin He; Muhammad Ali Imran; Wasim Ahmad



5. Inertial Sensors to Detect Multiple Gait Disorders, Wenhao Cheng; Yuxiang Guo; Pengting Chen; Yue Pang; Xinyun Jiang; Wasim Ahmad
6. Assistive and Monitoring Multifunctional Smart Crutch for Elderly, Jiaye Yang; Yanjun Liu; Yanjun Chen; Huiyang Nie; Wang Zhanqiu; Liu Xu; Muhammad Ali Imran; Wasim Ahmad
7. Novel Flexible and Wearable 2.4 GHz Antenna for Body Centric Applications, Abdoalbaset Abohmra; Sophia Ramani; Abubakar Sharif; Muhammad Ali Imran; Qammer H Abbasi; Wasim Ahmad

**15:20 – 17:00 Special Session on Computing and Applications for Cyber Internet of Things (CyberIoT) / Special Session on the Impact of Internet of Things on the Future Elderly Care (IoTonFEC)**

**Chair:**

1. AgentPi: An IoT Enabled Motion CCTV Surveillance System, Farhad Mehdipour
2. An Efficient Synchronization Algorithm in OFDM-based NB-IoT Systems, Yuxiang LV; Hao Qin; Zhiwei Liu; YaWen Dong; Weiyang Xu; Wenjiang Feng
3. An Emergency Mobile Communication System Based on Fixed-Wing Drone and Satellite Transmission Access, Yu Su
4. Joint Power Control and Pilot Assignment Algorithm in Multi-cell Multi-user Massive MIMO systems, Yuxiang LV; Qing Wu; Yajuan Guo; Zhiwei Liu; Xiaolong Bao; Wenjiang Feng
5. A Study on the Reduction of Mowing Work Burden for Maintaining Landscapes in Rural Areas: Experiment Design for Mowing behaviors Analyze, BO WU; Yuan Wu; Yoko Aoki; Shoji Nishimura; Masayuki Kashiwagi
6. Life Assistants for the Elderly Based on Mobile Devices, Wenjie Diao, Zhigang Gao, Ruichao Xu, Yunfeng Xie, Ke Yan, Hongyi Guo
7. Ubi-care: a Decentralized Ubiquitous Sensing Healthcare System for the Elderly Living Support, Hong Chen

**09:00 – 10:20 Special Session on Cyber System Security and Intelligence 1****Chair:**

1. An IGS Algorithm applied to DNA sequence design, Kaiqiang Liu; Bin Wang; Yuan Liu; Ranfeng Wu; Xun Zhang; Xin Liu; Qiang Zhang; Zhixiang Yin
2. An incremental feature selection approach based on information entropy for incomplete data, Chuan Luo; Tianrui Li; Zhang Yi
3. An Internet Medical Care-oriented Service Security Open Platform, Kexiong Dong; Weiwei Luo; Xiaohua Pan; Jianwei Yin
4. Commercial Security Scanning: Point-on-Sale (POS) Vulnerability and Mitigation Techniques, Farhad Mehdipour; Bahman A. Sarrafpour
5. Link Prediction Based on Gravitational Field of Complex Network, Yanlin Yang; Haixing Zhao; Zhonglin Ye; Lei Meng

**10:40 – 12:00 Special Session on Cyber System Security and Intelligence 2****Chair:**

1. Pulmonary nodule detection based on multi-branch 3D squeeze-and-excitation network, Yuechao Zhang, Jianxin Zhang, Chao Che, Kai Lin, Dongsheng Zhou, Qiang Zhang, Xiaopeng Wei
2. Research on Security Testing and Simulation Platform of Smart Grid Substation System, Xue Yudai; Wang Jinsong; Ding Yuemin; Honghao Zhang
3. A Semantic-based Short-text Fast Clustering Method on Hotline Records in Chengdu, Xiaorong Pu; Kun Long; Kecheng Chen; Mei Xie; Jiancheng Lv; Dezhong Peng
4. An Interactive System for Detection and Analysis of Mandibular Cystic Lesions, Jixiang Guo; Lei Zhang; Yuanyuan Chen; Wei Tang
5. Design, Development and Testing of a Wearable sEMG Acquisition System, Shi Lei; Wang Kunpeng; Zhen Liu

**13:00 – 17:00 Workshop on Assurance in Distributed Systems and Networks****Chair:**

1. Some technology issues in a connected world, Yukikazu Nakamoto
2. Model-based methods for quality evaluation of cloud services, Arun Adiththan; Kaliappa Ravindran
3. A Dynamic System for Forming Convoys Consisting of Connected Vehicles, Shinji Inoue; Kazuki Uyama; Yoshiaki Kakuda
4. Structural Change Models of Online Social Networks Caused by External Factors Like Mass Media, Yuya Kakizawa; Masaki Aida
5. Information Propagation that Induces Evacuation Behavior at the Time of Disaster, Eiji Utsunomiya
6. Evaluation Framework Using Simulator and Mobile Device for Developing Evacuation Route Guidance in MANET-based Building Evacuation System, Shinnosuke Murakami; Tomoyuki Ohta; Jürgen Dunkel; Yoshiaki Kakuda
7. Development of Local Landslide Danger-Related Information Notification System on TV Set for Early Evacuation, Koichi Shin; Haruka Kodama; Masahiro Nishi

**Day 3**

**Wednesday, 7<sup>th</sup> August 2019**

**Room: Ume**

**09:00 – 10:20 Workshop on Big Data Analytics for Cyber Security and Defence**

**Chair:**

1. A Large-Scale Empirical Study of Internet Users' Privacy Leakage in China, Yuanming Zhang; Shuo Zhang; Yuchao Zhang
2. Big Data Driven Computing Offloading Scheme with Driverless Vehicles Assistance, Chengling Chen; Zhou Su; Weiwei Li; Yuntao Wang
3. Large-scale Network Traffic Analysis and Retrieval System Using CFS Algorithm, Ting Han; Yuanming Zhang; Hezhen Li; Xiaoyu Zhang, Jing Tao; Pinghui Wang
4. User Identification Cross Multiple Social Media Platform with Revised Input Output Network Embedding Framework, Jingyuan Liu; Wei Li; Tao Qin; Liang Zhao; Yuli Gao; Wenqiang Ma

**10:40 – 12:00 Special Session on Cyber Social Computing and Cyber-Enabled Applications**

**Chair:**

1. A Hybrid Algorithm for Influence Maximization of Social Networks, Yongze Lin; Xinyuan Zhang; Liting Xia; Yue Ren; Weimin Li
2. Clinical Knowledge Graph Embeddings with Hierarchical Structure for Thyroid Treatment Recommendation, Dehua Chen; Chuang Ma; Yunying Wu
3. Influence Maximization Based on Node Attraction Model, Gui Jiang Wang; Jiulei Jiang; Weimin Li; Can Wang
4. OCDAD: An overlapping community detecting algorithm using micro network model ex-EgoNet in directed networks, Furong Chang; Bofeng Zhang; Songxian Wu; Yue Zhao; Bingchun Li; Jiarila Maimaitiriyimu
5. Quantitative  $\mu$ -calculus model checking algorithm based on generalized possibility measures, Panqing Zhang; Jiulei Jiang; Zhanyou Ma

**13:00 – 15:00 Workshop on Dependable Intelligent Systems**

**Chair:**

1. A Basic Framework for Localizing Aging-Related Bugs in a Random and Dynamic Way, Xiao-Yi Zhang; Junjun Zheng
2. Markov Model of Web Services for Their Performance Based on Phase-Type Expansion, Yanjie Liu; Jiantao Zhang
3. Experimental Study for Optimal Homotopy Property of Motion Planning Algorithms, Yang Liu; Jing Zhang; Yizhi Zeng; Haonan Yao; Jiantao Zhang
4. Multi-Concern Integrated Engineering of Dependable Intelligent Systems, Elena Troubitsyna
5. RRT\* algorithm under holonomic conditions for UAVs, Minyang Kang; Yizhi Zeng; Haonan Yao
6. FPGA-Based Implementation of Reduced-Complexity Filtering Algorithm for Real-Time Location Tracking, Yih-Shyh Chiou, Wei-Ting Chen, Fu-Jung Wen, Shih-Lun Chen, Yang-Ke Lin, Ting-Lan Lin
7. Research on reliable path planning of manipulator based on artificial beacons, Kai Zhao; Jia Song

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