

# The 2022 IEEE Cybermatics Congress

*The 5th IEEE International Conference on Blockchain (Blockchain-2022)*  
*The 15th IEEE International Conference on Cyber, Physical and Social Computing (CPSCoM-2022)*  
*The 15th IEEE International Conference on Internet of Things (iThings-2022)*  
*The 8th IEEE International Conference on Smart Data (SmartData-2022)*  
*The 18th IEEE International Conference on Green Computing and Communications (GreenCom-2022)*

August 22 – August 25, 2022 Espoo, Finland

<http://www.ieee-cybermatics.org/2022/cybermatics/>

Conference Program and Information Booklet



Organized by  
Aalto University and Xidian University



Sponsored by  
IEEE, IEEE Computer Society, IEEE System, Man, and Cybermatics Society  
IEEE Technical Committee on Scalable Computing, IEEE Technical Committee on Cybermatics,  
the IEEE Technology and Engineering Management Society



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# Presentation Guidelines

## Conference Date

The conference is to be held from August 22-25, 2022. The time for conference program is based on Helsinki, Eastern European Summer Time.

## For Session Chairs

Session Chairs are requested to join onsite or the virtual meeting room at least 10 minutes before their session.

## For Authors

For virtual presentation, you are strongly encouraged to join the virtual meeting room during your presentation and Q&A. Please confirm your attendance with the Session Chair at least 10 minutes before the session. For onsite presentation, you should register with your session chairs before your session.

## Timing

Please ensure you check the program for the exact time of your session and where your paper falls within the session. It is recommended that all IEEE iThings/GreenCom/CPSCoM/SmartData/Blockchain-2022 paper presentations use **10-15 minutes presentation time plus 5 minutes question time**. However, the Session Chairs will determine the exact presentation time for each paper, based on the number of presentations in each session. The Session Chairs will ensure that you do not over-run the time allocated.

## Proceedings

If you are interested in reading papers during the presentations, here are the proceedings:

IEEE Blockchain:

<https://>

IEEE iThings/GreenCom/CPSCoM/SmartData

<https://>

The username and passwords will be sent to all fully registered participants separately.

# Online Conference Venue

The congress will be held in a hybrid way, both onsite with ? meeting room and online via five zooms. A zoom is used for keynote. Other four zooms correspond to the four rooms, respectively, in the program. In addition to daily keynotes, you can enter any rooms that you are interested in onsite or via the links:

Keynote: <https://>

Room 1: <https://>

Room 2: <https://>

Room 3: <https://>

Room 4: <https://>

**For online participation, it is strongly recommended to join the Keynote or your interested rooms via the web-based virtual room (see the instruction below).**

After typing a link into your browser, click "Join from Your Browser" on your webpage and you will be joining the conference for free. In the event that the meeting passcode is required, please type ? for all above rooms.

During each presentation, you can type your question(s) in the virtual room. After the presentation, the session chair will ask the questions on behalf of you.

Beyond the online congress, if you want to replay any presentation (by clicking paper titles in the program booklet),

**FIRST you should add the following ALL four workspaces:**

<https://>

<https://>

<https://>

<https://>

**Just notice that please don't upload any files into slack, which will squeeze out the presentations.**

For any assistance, please contact [ieee-cybermatics-congress-2022@googlegroups.com](mailto:ieee-cybermatics-congress-2022@googlegroups.com).

Note: Onsite presentation session is highlighted as green; online presentation session is highlighted as yellow; hybrid session is highlighted as blue.

# The 2022 IEEE Cybermatics Congress

## Program Overview

| Monday August 22, 2022 (Eastern European Summer Time) |  |   |   |  |
|---|--|---|---|--|
| 10:00-16:00   | Registration (also on August 23 and 24, 2022)          |   |   |  |
| Room  | Room 1   | Room 2                                    | Room 3  | Room 4   |
| 13:00-14:00   | <b>Blockchain-13</b><br>BlockchainEvo (1)              | <b>Blockchain-17</b><br>FBS (1)           | <b>Blockchain-22</b><br>BSS (2) + SPB (3)                                 | <b>SmartData-7</b><br>DTEC                               |
| 14:00-15:00   | <b>Blockchain-19</b><br>BSS (1)                        | <b>Blockchain-18</b><br>FBS (2) + ISBM    | <b>Blockchain-14</b><br>BlockchainEvo (2)                                 | <b>SmartData-8</b><br>ESDPS                              |
| 15:00-15:15   | Break  |   |   |  |
| 15:15-16:15   | <b>Blockchain-20</b><br>SPB (1) +<br>BlockchainEvo (5) | <b>Blockchain-15</b><br>BlockchainEvo (3) | <b>iThings-7</b><br>Resource and Task<br>Allocation in IoT<br>Environment | <b>GreenCom-1</b><br>Smart Energy and<br>Smart Grids     |
| 16:15-17:15   | <b>Blockchain-16</b><br>BlockchainEvo (4)              | <b>Blockchain-21</b><br>SPB (2)           | <b>iThings-8</b><br>Data Security for Cloud<br>and Edge                   | <b>GreenCom-2</b><br>AI and Green Society<br>Application |

| Tuesday August 23, 2022 (Eastern European Summer Time) |   |  |   |
|--|---|--|---|
| 08:30-09:00  | Opening and Award Ceremony (Chaired by Prof. Raimo Kantola)   |  |   |
| 09:00-09:45  | <b>Keynote 1 (Room 1)</b> : Redactable Blockchain: Technologies, Applications and Future Directions<br><b>Dr. Chonggang Wang</b> , InterDigital, Inc., USA<br>Chaired by Prof. Wenjing Lou  |  |   |
| 09:45-10:30  | <b>Keynote 2 (Room 1)</b> : Neurosymbolic Autonomy and the Quest for Smart(er) Decision-Making<br><b>Dr. Alvaro Velasquez</b> , Information Directorate of the Air Force Research Laboratory, USA<br>Chaired by Prof. Honggang Wang |  |   |
| 10:30-11:00  | Break   |  |   |
| Room   | Room 1  | Room 2   | Room 3  |
| 11:00-12:00  | <b>Blockchain-1</b><br>Blockchain Applications (1)  | <b>iThings-1</b><br>Invited Talks                          | <b>GreenCom-3</b><br>Green Computing and<br>Communication   |
| 12:00-13:00  | Lunch Break   |  |   |
| 13:00-14:00  | <b>Blockchain-2</b><br>Blockchain Applications (2)  | <b>iThings-2</b><br>Edge Computing and IoT                 | <b>GreenCom-4</b><br>Invited Talks                          |
| 14:00-15:00  | <b>Blockchain-3</b><br>Blockchain Applications (3)  | <b>iThings-3</b><br>Deep Learning and IoT                  | <b>CPSCCom-1</b><br>Edge-Fog-Cloud Computing                |
| 15:00-15:30  | Break   |  |   |
| 15:30-16:30  | <b>Blockchain-4</b><br>Blockchain Applications (4)  | <b>iThings-4</b><br>Network Deployment and<br>Optimization | <b>CPSCCom-2</b><br>Networks and<br>Communications for CPSS |
| 16:30-17:30  | <b>Blockchain-5</b><br>Blockchain and Artificial<br>Intelligence  | <b>iThings-5</b><br>IoT Systems and Messaging              | <b>CPSCCom-3</b><br>Smart City and Smart World              |
| 18:00-19:30  | Reception   |  |   |

### Wednesday August 24, 2022 (Eastern European Summer Time)

|             |  |   |  |
|-------------|--|---|--|
| 09:00-09:45 | <b>Keynote 3:</b> Privacy and Transparency with Blockchain in the Era of Big Data, Machine Learning, IoT, and 5G<br><b>Elisa Bertino</b> , Purdue University, USA<br><b>Chaired by</b> Prof. Zheng Yan |   |  |
| 09:45-10:30 | <b>Keynote 4:</b> Achieving Cloud Data Security and Privacy in Zero Trust Environments<br><b>Robert H. Deng</b> , Singapore Management University, Singapore<br><b>Chaired by</b> Prof. Valtteri Niemi |   |  |
| 10:30-11:00 | <b>Break</b>   |   |  |
| Room        | <b>Room 1</b>  | <b>Room 2</b>   | <b>Room 3</b>  |
| 11:00-12:00 | <b>Blockchain-6</b><br>Blockchain Privacy and Security (1)   | <b>iThings-6</b><br>Smart City and Data Exchange                  | <b>CPSCom-4</b><br>Security and Privacy Preservation |
| 12:00-13:00 | <b>Lunch Break</b>   |   |  |
| 13:00-14:00 | <b>Blockchain-7</b><br>Blockchain Privacy and Security (2)   | <b>SmartData-1</b><br>Smart/Big Data Processing and Analytics (1) | <b>CPSCom-5</b><br>System-Level Design Methodology   |
| 14:00-15:00 | <b>Blockchain-8</b><br>Consensus Mechanisms (1)  | <b>SmartData-2</b><br>Smart/Big Data Processing and Analytics (2) | <b>CPSCom-6</b><br>Knowledge Systems for CPSS        |
| 15:00-15:30 | <b>Break</b>   |   |  |
| 15:30-16:30 | <b>Blockchain-9</b><br>Consensus Mechanisms (2)  | <b>SmartData-3</b><br>Smart/Big Data Processing and Analytics (3) | <b>CPSCom-7</b><br>Deep Learning in CPSS             |
| 16:30-17:30 | <b>Blockchain-10</b><br>Blockchain Trust   | <b>SmartData-4</b><br>Smart/Big Data Applications (1)             | <b>CPSCom-8</b><br>Adaptive and Intelligent Systems  |
| 19:00-21:00 | <b>Banquet</b>   |   |  |

### Thursday August 25, 2022 (Eastern European Summer Time)

|             |   |  |  |
|-------------|---|--|--|
| 09:00-09:45 | <b>Keynote 5 (Room 1):</b><br>?, Aalto University, Finland<br><b>Chaired by</b> Prof. Raimo Kantola |  |  |
| Room        | <b>Room 1</b>   | <b>Room 2</b>  | <b>Room 3</b>  |
| 09:45-10:45 | <b>Blockchain-11</b><br>Blockchain Optimization   | <b>SmartData-5</b><br>Smart/Big Data Applications (2)  | <b>CPSCom-9</b><br>Data-Driven Services in CPSS      |
| 10:45-11:15 | <b>Break</b>  |  |  |
| 11:15-12:15 | <b>Blockchain-12</b><br>Performance Analysis and Optimization                                       | <b>SmartData-6</b><br>Data Science and Its Foundations | <b>CPSCom-10</b><br>Efficient Architectures for CPSS |
| 12:15-13:30 | <b>Lunch Break</b>  |  |  |
| 13:30-14:15 | <b>Invited Talk 1 (Room 1):</b><br><b>Wenjing Lou</b><br><b>Chaired by</b> Prof. Raimo Kantola      |  |  |
| 14:15-15:00 | <b>Invited Talk 2 (Room 1):</b><br><b>Honggang Wang</b><br><b>Chaired by</b> Prof. Raimo Kantola    |  |  |
| 15:00-15:30 | <b>Break</b>  |  |  |
| 15:30-16:15 | <b>Invited Talk 3 (Room 1):</b><br><b>Hua Fang</b><br><b>Chaired by</b> Prof. Zheng Yan             |  |  |
| 16:15-17:00 | <b>Invited Talk 4:</b><br><b>Witold Pedrycz</b><br><b>Chaired by</b> Prof. Zheng Yan                |  |  |
| 17:00-17:30 | <b>Closing Session</b>  |  |  |

## Congress Keynotes

**Keynote: Elisa Bertino**, Purdue University, USA.

Privacy and Transparency with Blockchain in the Era of Big Data, Machine Learning, IoT, and 5G

**Keynote: Robert H. Deng**, Singapore Management University, Singapore.

Achieving Cloud Data Security and Privacy in Zero Trust Environments

**Keynote: Alvaro Velasquez**, Information Directorate of the Air Force Research Laboratory, USA.

Neurosymbolic Autonomy and the Quest for Smart(er) Decision-Making

**Keynote: Chonggang Wang**, InterDigital, Inc., USA.

Redactable Blockchain: Technologies, Applications and Future Directions

**The 2022 IEEE Cybermatics Congress**  
**IEEE Blockchain/CPSCoM/iThings/SmartData/GreenCom-2022**

**Keynote: *Privacy and Transparency with Blockchain in the Era of Big Data, Machine Learning, IoT, and 5G***

*Elisa Bertino, Purdue University, USA.*

**About the Keynote Speaker**



Elisa Bertino is Samuel Conte professor of Computer Science at Purdue University. She serves as Director of the Purdue Cyberspace Security Lab (Cyber2Slab). Prior to joining Purdue, she was a professor and department head at the Department of Computer Science and Communication of the University of Milan. She has been a visiting researcher at the IBM Research Laboratory in San Jose (now Almaden), at Rutgers University, at Telcordia Technologies. She has also held visiting professor positions at the Singapore National University and the Singapore Management University. Her main research interests include security, privacy, database systems, distributed systems, and sensor networks. Her recent research focuses on cybersecurity

and privacy of cellular networks and IoT systems, and on edge analytics for cybersecurity. Elisa Bertino is a Fellow member of IEEE, ACM, and AAAS. She received the 2002 IEEE Computer Society Technical Achievement Award for “For outstanding contributions to database systems and database security and advanced data management systems”, the 2005 IEEE Computer Society Tsutomu Kanai Award for “Pioneering and innovative research contributions to secure distributed systems”, the 2019-2020 ACM Athena Lecturer Award, and the 2021 IEEE 2021 Innovation in Societal Infrastructure Award.

**Summary:**

Technological advances, such as IoT devices, cyber-physical systems, smart mobile devices, cloud systems, data analytics, social networks and increased communication capabilities, are making possible to capture, and to quickly process and analyze huge amounts of data from which to extract information critical for many critical tasks, such as healthcare security and cyber security. In the area of cyber security, such tasks include user authentication, access control, anomaly detection, user monitoring, and protection from insider threat. By collecting and mining data concerning user travels, contacts and disease outbreaks one can predict disease spreading across geographical areas. And those are just a few examples. The use of data for those tasks raises however major privacy concerns. Collected data, even if anonymized by removing identifiers such as names or social security numbers, when linked with other data may lead to re-identify the individuals to which specific data items are related to. Also, as organizations, such as governmental agencies, often need to collaborate on security tasks, data sets are exchanged across different organizations, resulting in these data sets being available to many different parties. Privacy breaches may occur at many different layers and components in our interconnected systems. In this talk, I first present an interesting privacy attack that exploits paging occasion in 5G cellular networks. Such attack shows that achieving privacy is challenging and there is no unique technique that one can use; rather one must combine different techniques depending also on the intended use of data. Examples of these techniques and their applications are presented. Then, I discuss the notion of data transparency – critical for fair and correct data use, and how blockchain technologies can support data transparency.



**The 2022 IEEE Cybermatics Congress  
IEEE Blockchain/CPSCoM/iThings/SmartData/GreenCom-2022**

**Keynote: *Achieving Cloud Data Security and Privacy in Zero Trust Environments***  
*Robert H. Deng, Singapore Management University, Singapore.*

**About the Keynote Speaker**



Robert Deng is AXA Chair Professor of Cybersecurity, Director of the Secure Mobile Centre, and Deputy Dean for Faculty & Research, School of Computing and Information Systems, Singapore Management University. His research interests are in the areas of data security and privacy, network security, and applied cryptography. He received the Outstanding University Researcher Award from National University of Singapore, Lee Kuan Yew Fellowship for Research Excellence from SMU, and Asia-Pacific Information Security Leadership Achievements Community Service Star from International Information Systems Security Certification Consortium. He

serves/served on the editorial boards of ACM Transactions on Privacy and Security, IEEE Security & Privacy, IEEE Transactions on Dependable and Secure Computing, IEEE Transactions on Information Forensics and Security, Journal of Computer Science and Technology, and Steering Committee Chair of the ACM Asia Conference on Computer and Communications Security. He is a Fellow of IEEE and Fellow of Academy of Engineering Singapore.

**Summary:**

This talk will provide an overview on the design and implementation of a system for secure access, search, and computation of encrypted data in the cloud for enterprise users. The system is designed following the “zero trust” paradigm to protect data security and privacy even if cloud storage servers or user accounts are compromised. This is achieved using end-to-end (E2E) encryption in which encryption and decryption operations only take place at client devices. However, encryption must not hinder access, search and even computation of data by authorized users. There are numerous academic publications in this area and the choice of which cryptographic techniques to use could have significant impact on the system’s scalability and usability. We will share our experience in the design of the system architecture and selection of cryptographic techniques with a consideration to balance security, performance, and usability.

**The 2022 IEEE Cybermatics Congress  
IEEE Blockchain/CPSCoM/iThings/SmartData/GreenCom-2022**

**Keynote: *Neurosymbolic Autonomy and the Quest for Smart(er) Decision-Making***  
*Alvaro Velasquez, Information Directorate of the Air Force Research Laboratory, USA.*

**About the Keynote Speaker**



Alvaro Velasquez leads the machine intelligence sub-portfolio of investments for the Information Directorate of the Air Force Research Laboratory (AFRL) in the United States. In this capacity, he manages and proposes new research directions and technology transitions for the Air Force in the fields of artificial intelligence and autonomous systems. This entails close collaboration with both the academic and private sectors. Alvaro received his PhD in Computer Science from the University of Central Florida and holds an interdisciplinary research record, including publications in artificial intelligence, combinatorial optimization, networking, cloud computing, and logic and circuit design. Alvaro is a recipient of numerous awards, including the National Science Foundation Graduate Research Fellowship Program (NSF GRFP) award, the University of Central Florida 30 Under 30 award, and best paper and patent awards from AFRL. He serves as Associate Editor of IEEE Transactions on Artificial Intelligence and his research is currently funded by the Air Force Office of Scientific Research.

**Summary:**

Neurosymbolic Artificial Intelligence has experienced a renaissance and gained much traction in recent years as a potential “third wave” of AI to follow the tremendously successful second wave underpinned by statistical deep learning. This seeks the integration of neural learning systems and formal symbolic reasoning for more efficient, robust, and explainable AI. Such an integration holds much promise in areas like reinforcement learning and planning, where tremendous progress has been made in recent years, including great feats like the defeat of the world Go champion and powerful agents for real-time strategy games. However, the tremendous success of autonomous decision-making has highlighted its own shortcomings when it comes to data limitations, robustness, and trust, among other things. This talk presents some of these challenges and opportunities facing the development of neurosymbolic autonomy, how this differs from conventional neurosymbolic AI problems like classification and natural language processing, and potential implications to facilitating the broader adoption of autonomous solutions.

**The 2022 IEEE Cybermatics Congress  
IEEE Blockchain/CPSCoM/iThings/SmartData/GreenCom-2022**

**Keynote: *Redactable Blockchain: Technologies, Applications and Future Directions***  
*Chonggang Wang, InterDigital, Inc., USA.*

**About the Keynote Speaker**



Chonggang Wang is currently a Principal Engineer with InterDigital, Inc., USA. He has more than 20 years of experience in the fields of wireless communications, networking, and computing, including research, development, and standardization. His recent research interests include blockchain and distributed ledger technology, blockchain-enabled future wireless, blockchain-enabled collaborative artificial intelligence, NextG wireless networks and system. He was/is the rapporteur of several blockchain-related work programs with ETSI Industry Specification Group (ISG) on Permissioned Distributed Ledgers (PDL). He is the Founding Editor-in-Chief of the IEEE Internet of Things Journal and is currently the Editor-in-Chief of IEEE Network Magazine. He is a Fellow of IEEE.

Things Journal and is currently the Editor-in-Chief of IEEE Network Magazine. He is a Fellow of IEEE.

**Summary:**

Blockchain and distributed ledger technology started as a decentralized infrastructure to enable and manage digital currency like Bitcoin without relying on a central authority. One of the attractive features provided by blockchain technology is its append-only “immutability” feature, which means the stored data cannot be modified or manipulated by any means once it is validated in the blockchain ledger. Such immutability helps traceability, auditing, and non-repudiation, which builds decentralized trust among untrusted parties. Despite that, immutability if misused could lead to the permanent existence of sensitive information and misinformation in the blockchain. Incidents like broadcasting illegal content have already taken their place in blockchain systems. Such incidents call for prompt solutions for mitigation. One emerging research theme, “redactable blockchain” provides approaches for modifying ledgers with certain controllability. This keynote will discuss the current research landscape about redactable blockchain. It will first describe the motivations behind redactable blockchain. Then, technologies for supporting redactable blockchain, including new blockchain structure will be explained. New applications that can be enabled by redactable blockchain and future research directions will be shared as well.

## Technical Program of IEEE Blockchain 2022

### Monday August 22, 2022 (Eastern European Summer Time)

|             |                        |                        |                        |
|-------------|------------------------|------------------------|------------------------|
| 10:00-12:00 | Registration           |                        |                        |
| 13:00-14:00 | Blockchain-13 (Room 1) | Blockchain-17 (Room 2) | Blockchain-22 (Room 3) |
| 14:00-15:00 | Blockchain-19 (Room 1) | Blockchain-18 (Room 2) | Blockchain-14 (Room 3) |
| 15:00-15:15 | Break                  |                        |                        |
| 15:15-16:15 | Blockchain-20 (Room 1) | Blockchain-15 (Room 2) |                        |
| 16:15-17:15 | Blockchain-16 (Room 1) | Blockchain-21 (Room 2) |                        |

### Tuesday August 23, 2022 (Eastern European Summer Time)

|             |   |  |  |
|-------------|---|--|--|
| 08:30-09:00 | Opening and Award Ceremony  |  |  |
| 09:00-09:45 | Keynote 1 (Room 1): Dr. Chonggang Wang, InterDigital, Inc., USA   |  |  |
| 09:45-10:30 | Keynote 2 (Room 1): Dr. Alvaro Velasquez, Information Directorate of the Air Force Research Laboratory, USA |  |  |
| 10:30-11:00 | Break   |  |  |
| 11:00-12:00 | Blockchain-1 (Room 1)   |  |  |
| 12:00-13:00 | Lunch Break   |  |  |
| 13:00-14:00 | Blockchain-2 (Room 1)   |  |  |
| 14:00-15:00 | Blockchain-3 (Room 1)   |  |  |
| 15:00-15:30 | Break   |  |  |
| 15:30-16:30 | Blockchain-4 (Room 1)   |  |  |
| 16:30-17:30 | Blockchain-5 (Room 1)   |  |  |
| 18:00-19:30 | Reception   |  |  |

### Tuesday August 24, 2022 (Eastern European Summer Time)

|             |   |  |  |
|-------------|---|--|--|
| 09:00-09:45 | Keynote 3: Elisa Bertino, Purdue University, USA                      |  |  |
| 09:45-10:30 | Keynote 4: Robert H. Deng, Singapore Management University, Singapore |  |  |
| 10:30-11:00 | Break   |  |  |
| 11:00-12:00 | Blockchain-6 (Room 1)   |  |  |
| 12:00-13:00 | Lunch Break   |  |  |
| 13:00-14:00 | Blockchain-7 (Room 1)   |  |  |
| 14:00-15:00 | Blockchain-8 (Room 1)   |  |  |
| 15:00-15:30 | Break   |  |  |
| 15:30-16:30 | Blockchain-9 (Room 1)   |  |  |
| 16:30-17:30 | Blockchain-10 (Room 1)  |  |  |
| 19:00-21:00 | Banquet   |  |  |

### Thursday August 25, 2022 (Eastern European Summer Time)

|             |  |  |  |
|-------------|--|--|--|
| 09:00-09:45 | Keynote 5 (Room 1): ?, Aalto University, Finland |  |  |
| 09:45-10:45 | Blockchain-11 (Room 1)                           |  |  |
| 10:45-11:15 | Break  |  |  |
| 11:15-12:15 | Blockchain-12 (Room 1)                           |  |  |
| 12:15-13:30 | Lunch Break                                      |  |  |
| 13:30-14:15 | Invited Talk 1 (Room 1): Wenjing Lou             |  |  |
| 14:15-15:00 | Invited Talk 2 (Room 1): Honggang Wang           |  |  |
| 15:00-15:30 | Break  |  |  |
| 15:30-16:15 | Invited Talk 3 (Room 1): Hua Fang                |  |  |

|             |                                |
|-------------|--------------------------------|
| 16:15-17:00 | Invited Talk 4: Witold Pedrycz |
| 17:00-17:30 | Closing Session                |

## Blockchain-1: Blockchain Applications (1)

### 1. #1570807250: Blockchain-Based Solutions for Education Credentialing System: Comparison and Implications for Future Development

*Zoey Ziyi Li, Joseph Liu, Jiangshan Yu and Dragan Gasevic (Monash University, Australia)*

### 2. #1570808056: DevLeChain - an Open Blockchain Development Platform for Decentralized Applications

*Wei-Yang Chiu and Weizhi Meng (Technical University of Denmark, Denmark)*

### 3. #1570807354: Decentralized Health Data Distribution: A DLT-Based Architecture for Data Protection

*Gioele Bigini (University of Urbino, Italy); Mirko Zichichi (Universidad Politécnica de Madrid, Spain); Emanuele Lattanzi and Stefano Ferretti (University of Urbino, Italy); Gabriele D'Angelo (University of Bologna, Italy)*

## Blockchain-2: Blockchain Applications (2)

### 1. #1570807922: CODE: Blockchain-Based Travel Rule Compliance System

*Chaehyeon Lee, Changhoon Kang and Wonseok Choi (POSTECH, Korea (South)); Myunghun Cha (Coinone, Korea (South)); Jongsoo Woo and James Won-Ki Hong (POSTECH, Korea (South))*

### 2. #1570800990: Fortuna: A Novel Staked Voting System for Distributed Pari-Mutuel Gaming

*Tucker S Moore and Nathan Marshall (USA); Eric W. Burger (Georgetown University & Former CTO, Federal Communications Commission, USA)*

### 3. #1570807861: DeSAT: Towards Transparent and Decentralized University Counselling Process

*Dhaval Thummar, Jahnavi Yerramaddu, Prathyusha Mudavath and Sayad Shahanaz (National Institute of Technology Karnataka, India); Bishakh Chandra Ghosh (Indian Institute of Technology Kharagpur, India); Sourav Kanti Addya (National Institute of Technology Karnataka, India)*

## Blockchain-3: Blockchain Applications (3)

### 1. #1570807975: BSMFS: Blockchain Assisted Secure Multi-Keyword Fuzzy Search Over Encrypted Data

*Partha Sarathi Chakraborty (Indian Institute of Technology Patna, India); Mangesh Shivaji Chandrawanshi (Indian Institute of Technology (IIT), Patna, India); Somanath Tripathy and Puspesh Kumar (IIT Patna, India)*

### 2. #1570801160: Two-Stage Market-Based Task Allocation for Blockchain-Based Cyber-Physical Production Systems

*Larissa Kraemer, Rico Ahlbaeumer and Moritz Roidl (TU Dortmund University, Germany)*

### 3. #1570800923: $\lambda$ - Constant Function Markets: Generalizing and Mixing Automated Market Makers

*Giorgos Felekis (Advanced Blockchain AG, Greece); Jesper Kristensen (Advanced Blockchain, USA)*

## Blockchain-4: Blockchain Applications (4)

### 1. #1570799511: Monitoring Provenance of Delegated Personal Data with Blockchain

*Chanyang Ju (Hanyang University, Korea (South)); Wenyi Tang (University of Notre Dame, USA); Gwangwoon Lee (Hanyang University, Korea (South)); Changhao Chenli (University of Notre Dame, USA); Jae Hong Seo (Hanyang University, Korea (South)); Taeho Jung (University of Notre Dame, USA)*

**2. #1570805271: Blockchain-Based Authenticated Stego-Channels: A Security Framework and Construction**  
*Vikram Kanth and Britta Hale (Naval Postgraduate School, USA)*

**3. #1570808041: Decentralized Authorization Using Hyperledger Fabric**  
*Muthukur Venkata Akhil Vasishtha (IIT Kharagpur, India); Balaji Palanisamy (University of Pittsburgh, USA); Shamik Sural (IIT Kharagpur, India)*

## Blockchain-5: Blockchain and Artificial Intelligence

**1. #1570800885: SmartMixModel: Machine Learning-Based Vulnerability Detection of Solidity Smart Contracts**

*Supriya Shakya (IIT Patna, India); Arnab Mukherjee (RCC Institute of Information Technology, India); Raju Halder (IIT Patna, India); Abyayananda Maiti (Indian Institute of Technology Patna, India); Amrita Chaturvedi (Indian Institute of Technology (BHU), Varanasi, India)*

**2. #1570801194: Cryptocurrency Price Prediction with Multi-Task Multi-Step Sequence-To-Sequence Modeling**

*Jesper Kristensen (Advanced Blockchain, USA); Juan Pablo Madrigal Cianci (Advanced Blockchain AG & EPFL, Switzerland); Giorgos Felekis (Advanced Blockchain AG, Greece); Maria Liatsikou (Greece)*

**3. #1570807009: Blockchain-Based Federated Learning for Industrial Metaverses: Incentive Scheme with Optimal AoI**

*Jiawen Kang (Nanyang Technological University, Singapore); Dongdong Ye (Guangdong University of Technology, China); Jiangtian Nie (Nanyang Technological University (NTU), Singapore); Jiang Xiao and Xianjun Deng (Huazhong University of Science and Technology, China); Siming Wang (Guangdong University of Technology, China); Zehui Xiong (Singapore University of Technology and Design, Singapore); Rong Yu (Guangdong University of Technology, China); Dusit Niyato (Nanyang Technological University, Singapore)*

## Blockchain-6: Blockchain Privacy and Security (1)

**1. #1570807641: Integrating Group Signatures in Complex Decentralized Marketplace Transactions for Improved Buyer Privacy**

*Sen Qiao, Varun Varun Madathil and Kemafor Anyanwu (North Carolina State University, USA)*

**2. #1570807939: PrivChain: Provenance and Privacy Preservation in Blockchain Enabled Supply Chains**  
*Sidra Malik (UNSW, Australia); Volkan Dedeoglu (CSIRO, Australia); Salil S Kanhere (UNSW Sydney, Australia); Raja Jurdak (Queensland University of Technology & CSIRO, Australia)*

**3. #1570796500: Permissionless Blockchain-Based Sybil-Resistant Self-Sovereign Identity Utilizing Attested Execution Secure Processors**

*Koichi Moriyama (Institute of Information Security & NTT DOCOMO, INC., Japan); Akira Otsuka (Institute of Information Security & Chuo University, Japan)*

## Blockchain-7: Blockchain Privacy and Security (2)

### 1. #1570807852: A Distributed Clock Synchronization Protocol for Proof of Stake Blockchains

*Yuya Miki (Tokyo Institute of Technology, Japan); Kazuyuki Shudo (Kyoto University, Japan)*

### 2. #1570801031: Advancing Blockchain-Based Federated Learning Through Verifiable Off-Chain Computations

*Jonathan Heiss and Elias Grünwald (TU Berlin, Germany); Nikolas Haimerl (TU Wien, Austria); Stefan Schulte (Hamburg University of Technology, Germany); Stefan Tai (TU Berlin, Germany)*

### 3. #1570800734: FPLotto: A Fair Blockchain-Based Lottery Scheme for Privacy Protection

*Yuechen Pan, Yiwen Zhao, Gang Wang and Xiaoguang Liu (Nankai University, China); Ming Su (Department of Computer Science, Nankai University, China)*

## Blockchain-8: Consensus Mechanisms (1)

### 1. #1570800862: Agent-Based Modelling of Bitcoin Consensus without Block Rewards

*Benjamin Kraner (University of Zurich, Switzerland); Shengnan Li (University of Zürich, Switzerland); Andreia Sofia Teixeira (University of Lisbon, Portugal); Claudio Juan Tessone (University of Zurich, Switzerland)*

### 2. #1570807316: Setchain: Improving Blockchain Scalability with Byzantine Distributed Sets and Barriers

*Margarita Capretto and Martín Ceresa (IMDEA Software Institute, Spain); Antonio Fernández Anta and Antonio Russo (IMDEA Networks Institute, Spain); César Sánchez (IMDEA Software Institute, Spain)*

### 3. #1570807400: Mosaic - A Blockchain Consensus Algorithm Based on Random Number Generation

*Zhengzhong Sun, Wei-Yang Chiu and Weizhi Meng (Technical University of Denmark, Denmark)*

## Blockchain-9: Consensus Mechanisms (2)

### 1. #1570800827: A New PoW Consensus of Blockchain Based on Legendre Sequence

*Ye Yuan and Yiwen Zhao (Nankai University, China); Ming Su (Department of Computer Science, Nankai University, China); Gang Wang and Xiaoguang Liu (Nankai University, China)*

### 2. #1570807083: On the Storage Overhead of Proof-Of-Work Blockchains

*Alessandro Sforzin (NEC Laboratories Europe GmbH, Germany); Matteo Maso (AiSight, Germany); Claudio Soriente (NEC Laboratories Europe, Germany); Ghassan O. Karame (Ruhr-University Bochum, Germany)*

### 3. #1570807890: Optimal Mining: Maximizing Bitcoin Miners' Revenues from Transaction Fees

*Mohsen Alambardar Meybodi (University of Isfahan, Iran); Amir Kafshdar Goharshady (Hong Kong University of Science and Technology, Hong Kong); Mohammad Reza Hooshmandasl (University of Mohaghegh Ardabili & Computer Science, Iran); Ali Shakiba (Vali-e-Asr University of Rafsanjan, Iran)*

## Blockchain-10: Blockchain Trust

### 1. #1570807825: PeloPartition: Improving Blockchain Resilience to Network Partitioning

*Juncheng Fang and Farzad Habibi (University of California, Irvine, USA); Kevin C Bruhwiler, Fayzah Alshammari, Abhishek Singh and Yinan Zhou (University of California - Irvine, USA); Faisal Nawab (University of California,*

Irvine, USA)

**2. #1570800937: The Philos Trust Algorithm: Preventing Exploitation of Distributed Trust**

*Pam Russell and Philip N Brown (University of Colorado Colorado Springs, USA)*

**3. #1570808115: Authenticated Multi-Version Index for Blockchain-Based Range Queries on Historical Data**

*Shlomi Linoy (University of New Brunswick, Canada); Suprio Ray (University of New Brunswick, Fredericton, Canada); Natalia Stakhanova (University of Saskatchewan, Canada)*

## Blockchain-11: Blockchain Optimization

**1. #1570807613: Block Interval Adjustment Based on Block Propagation Time in a Blockchain**

*Masumi Arakawa (Tokyo Institute of Technology, Japan); Kazuyuki Shudo (Kyoto University, Japan)*

**2. #1570800583: Graph Analysis of the Ethereum Blockchain Data: A Survey of Datasets, Techniques, and Future Direction**

*Arijit Khan (Aalborg University, Denmark)*

**3. #1570808069: Cost and Performance Analysis on Decentralized File Systems for Blockchain-Based Applications: State-Of-The-Art Report**

*Zhongli Dong (The University of Sydney, Australia); Aisyah Ismail and Mark Toohey (Aglive Lab, Australia); Young Choon Lee (Macquarie University, Australia); Albert Zomaya (The University of Sydney, Australia)*

## Blockchain-12: Performance Analysis and Optimization

**1. #1570806966: Analysis of Polkadot: Architecture, Internals, and Contradictions**

*Hanaa Abbas, Maurantonio Caprolu and Roberto Di Pietro (Hamad Bin Khalifa University, Qatar)*

**2. #1570807586: SegWit Extension and Improvement of the BlockSim Bitcoin Simulator**

*Mariano Basile, Gianluca Dini, Pericle Perazzo and Giovanni Nardini (University of Pisa, Italy)*

**3. #1570807819: A Scalable Blockchain-Based Smart Contract Model for Decentralized Voltage Stability Using Sharding Technique**

*Kimia Honari and Xiaotian Zhou (University of Alberta, Canada); Sara Rouhani (University of Manitoba, Canada); Scott Dick, Hao Liang, Yunwei Li and James Miller (University of Alberta, Canada)*

## Blockchain-13: BlockchainEvo (1)

**1. #1570807972: A Data Science Pipeline for Algorithmic Trading: A Comparative Study in Applications to Finance and Cryptoeconomics**

*Luyao Zhang (Duke Kunshan University & SciEcon CIC, China); Tianyu Wu, Jiayi Li, Carlos-Gustavo Salas-Flores and Saad Lahrichi (Duke Kunshan University, China)*

**2. #1570800515: Block Pruning with UTXO Aggregation**

*Taegyung Song (Tokyo Institute of Technology, Japan); Kazuyuki Shudo (Kyoto University, Japan)*



**3. #1570800638: Public Blockchain-Based Lightweight Anonymous Authentication Platform Using Zk-SNARKs for Low-Power IoT Devices**

*Jing Huey Khor (University of Southampton Malaysia, Malaysia); Michail Sidorov (Toyohashi University of Technology, Japan); Nathan Tze Min Ho and Tze Hank Chia (University of Southampton, United Kingdom (Great Britain))*

## **Blockchain-14: BlockchainEvo (2)**

**1. #1570807983: BLOCKVAC: A Universally Acceptable and Ideal Vaccination System on Blockchain**

*Manika Sharma (International Institute of Information Technology, Hyderabad, India); Kishore Kothapalli (International Institute of Information Technology, India); Sujit Gujar (International Institute of Information Technology, Hyderabad, India)*

**2. #1570800729: CASC: Content Addressed Smart Contracts**

*Markus Knecht (University of Zürich & University of Applied Sciences Northwestern Switzerland, Switzerland); Burkhard Stiller (University of Zürich, Switzerland)*

**3. #1570800748: TAIRA-BSC - Trusting AI in Recruitment Applications Through Blockchain Smart Contracts**

*Mona J Alshahrani (University Of Sussex & Imam Muhammad ibn Saud Islamic University, United Kingdom (Great Britain)); Monirah Ali Aleisa (Sussex, United Kingdom (Great Britain)); Natalia Beloff and Martin White (University of Sussex, United Kingdom (Great Britain))*

**4. #1570800130: Implementation of Digital Log-Book System for Lifts and Escalators Based on Blockchain Technology**

*Wai-Keung Yeung and Stephen Tong (Capax Technology Limited, Hong Kong); Jerry Wong and Mentor Cheung (The Government of the Hong Kong SAR, Hong Kong); Ashley Cheung (Capax Technology Limited, Hong Kong); Graham Lui and Kevin Cheng (The Government of the Hong Kong SAR, Hong Kong)*

## **Blockchain-15: BlockchainEvo (3)**

**1. #1570800105: CredTrust: Credential Based Issuer Management for Trust in Self-Sovereign Identity**

*Rahma Mukta (UNSW Sydney, Australia); Hye-young Paik (University of New South Wales, Australia); Qinghua Lu (CSIRO, Australia); Salil S Kanhere (UNSW Sydney, Australia)*

**2. #1570805149: Fairledger: A Fair Proof-Of-Sequential-Work Based Lightweight Distributed Ledger for IoT Networks**

*Ronghua Xu and Yu Chen (Binghamton University, USA)*

**3. #1570808010: You've Got a Friend in ME (Mobile Edge): Blockchain Processing with Cloud Node Backup**

*Zane Karl (University of California, Irvine, USA); Hayden Freedman (University of California, Irvine, United States); Abhishek Singh (University of California - Irvine, USA); Ahmad Showail (Taibah University, Saudi Arabia); Samaa Gazzaz (UC Santa Cruz, USA); Faisal Nawab (University of California, Irvine, USA)*

## **Blockchain-16: BlockchainEvo (4)**

**1. #1570807786: Analyzing Soft and Hard Partitions of Global-Scale Blockchain Systems**

Kevin C Bruhwiler and Fayzah Alshammari (University of California - Irvine, USA); Farzad Habibi and Juncheng Fang (University of California, Irvine, USA); Yanan Zhou and Abhishek Singh (University of California - Irvine, USA); Ahmad Showail (Taibah University, Saudi Arabia); Faisal Nawab (University of California, Irvine, USA)

**2. #1570807964: LiftChain: A Scalable Multi-Stage NFT Transaction Protocol**

Hari Kishore Chaparala and Sai Vineeth Doddala (University of California Irvine, USA); Ahmad Showail (Taibah University, Saudi Arabia); Abhishek Singh (University of California - Irvine, USA); Samaa Gazzaz (UC Santa Cruz, USA); Faisal Nawab (University of California, Irvine, USA)

**3. #1570800440: Enhancing Scalability with Payment Requests Aggregation in Lightning Network**

Jungbeom Seo (Pohang University of Science and Engineering, Korea (South)); Jong Kim (POSTECH, Korea (South))

## Blockchain-17: FBS (1)

**1. #1570795735: A Sealed-Bid Auction with Fund Binding: Preventing Maximum Bidding Price Leakage**

Kota Chin (University of Tsukuba, Japan); Keita Emura (National Institute of Information and Communications Technology, Japan); Kazumasa Omote (University of Tsukuba, Japan); Shingo Sato (Yokohama National University, Japan)

**2. #1570794150: Frax: A Fractional-Algorithmic Stablecoin Protocol**

Sam Kazemian (Everipedia, USA); Jason Huan (UCLA, USA); Jonathan Shomroni (Reichman University, Israel); Kedar Iyer (Everipedia, USA)

**3. #1570794237: Privacy-Preserving Energy Trading Using Blockchain and Zero Knowledge Proof**

Dongkun Hou (Xi'an Jiaotong-Liverpool University, China); Jie Zhang (Xi An Jiaotong-Liverpool University, China); Sida Huang, Jieming Ma and Xiaohui Zhu (Xi'an Jiaotong-Liverpool University, China)

**4. #1570807938: Proposal of a Smart Contract-Based Security Token Management System**

Shingo Fujimoto (University of Tsukuba & FUJITSU Limited, Japan); Kazumasa Omote (University of Tsukuba, Japan)

## Blockchain-18: FBS (2) + ISBM

**1. #1570800814: Time-Efficient Decentralized Exchange of Everlasting Options with Exotic Payoff Functions**

Juan Pablo Madrigal Cianci (Advanced Blockchain AG & EPFL, Switzerland); Jesper Kristensen (Advanced Blockchain, USA)

**2. #1570800727: Advanced Ledger: Supply Chain Management with Contribution Trails and Fair Reward Distribution**

Takeshi Miyamae, Satoru Nishimaki, Makoto Nakamura, Takeru Fukuoka and Masanobu Morinaga (Fujitsu Limited, Japan)

**3. #1570800345: Blockchain-Related Identity and Access Management Challenges: (De)Centralized Digital Identities Regulation**

## Blockchain-19: BSS (1)

### 1. #1570810701: A Blockchain Implementation for Configurable Multi-Factor Challenge-Set Self-Sovereign Identity Authentication

Alexander Nortá (Dymaxion OU); Alexandr Kormiltsyn (Dymaxion OU, Estonia); Chibuzor Udokwu (Dymaxion OU, Austria); Vimal Dwivedi (Tallinn University of Technology, Estonia); Sunday Aroh (Dymaxion OU, Niger); Ignas Ignas Nikolajev (Dymaxion OU, Estonia)

### 2. #1570811104: Cosmos Cash: Public Permissionless Approach Towards SSI and Use Cases

Har Preet Singh (Tendermint, Germany); David Grierson (Tendermint, United Kingdom (Great Britain)); Patrick McHale (Tendermint, Australia); Andrea Giacobino (Tendermint, Germany); Simon Maggs (Tendermint, United Kingdom (Great Britain))

### 3. #1570811711: Data Integrity Verification in Network Slicing Using Oracles and Smart Contracts

Joao Paulo Brito Gonçalves (Instituto Federal do Espírito Santo, Brazil); Gustavo Alochio and Roberta Gomes (UFES, Brazil); Rodolfo S Villaca (Federal University of Espírito Santo (UFES), Brazil)

## Blockchain-20: SPB (1) + BlockchainEvo (5)

### 1. #1570811260: A Blockchain Incentive Architecture for Federated Learning

Joao Paulo Brito Gonçalves (Instituto Federal do Espírito Santo, Brazil)

### 2. #1570811708: IoT Data Storage on a Blockchain Using Smart Contracts and IPFS

Joao Paulo Brito Gonçalves (Instituto Federal do Espírito Santo, Brazil), Gabriel Spelta (Federal University of Espírito Santo (UFES), Brazil), Rodolfo S Villaca (Federal University of Espírito Santo (UFES), Brazil), Roberta Gomes (Federal University of Espírito Santo (UFES), Brazil)

### 3. #1570800900: Towards Achieving Confidentiality in Hyperledger Fabric

Benedikt Hofmann, Prabhakaran Kasinathan and Martin Wimmer (Siemens AG, Germany)

## Blockchain-21: SPB (2)

### 1. #1570811599: Security Analysis of DeFi: Vulnerabilities, Attacks and Advances

Wenkai Li (Hainan University, China), Jiuyang Bu (Hainan University, China), Xiaoqi Li (Hainan University, China), Xianyi Chen (Hainan University, China)

### 2. #1570811643: A Survey on Safety Regulation Technology of Blockchain Application and Blockchain Ecology

Penxu Shen (Hainan University), Hong Lei (Hainan University & SSC Holding Company Ltd, China)

### 3. #1570811660: Decentralized and Self-Sovereign Identity in the Era of Blockchain A Survey

Yirui Bai (Hainan University, China)

## Blockchain-22: BSS (2) + SPB (3)

**1. #1570806942: Interwoven Hash of Vicious Circle Free Graph**

*Dominik Tomaszuk (University of Białystok & MakoLab, Poland); Szymon Głęb and Filip Turoboś (Łódź University of Technology, Poland); Tomasz Pawlik, Dominik Kuziński and Mirek Sopek (MakoLab S.A., Poland)*

**2. #1570811489: Scalable Multi-Chain Coordination via the Hierarchical Longest Chain Rule**

*Yanni Georghiades (University of Texas, Austin, USA); Karl Kreder (GridPlus Inc, USA); Jonathan Downing and Alan Orwick (Dominant Strategies, USA); Sriram Vishwanath (University of Texas Austin, USA)*

**3. #1570811749: A Minimal Disclosure Signature Authentication Scheme Based on Consortium Blockchain**

*Zelin Yang (Xidian University & National Computer Network Intrusion Protection Center, China), Hui Ma (Xidian University & National Computer Network Intrusion Protection Center, China), Mingchao Ai (Xidian University & National Computer Network Intrusion Protection Center, China), Meijie Zhan (Xidian University & National Computer Network Intrusion Protection Center, China), Gaofei Wu (Xidian University & National Computer Network Intrusion Protection Center, China), Yuqing Zhang (University of Chinese Academy of Sciences, China)*

# Technical Program of CPSCom 2022

## Tuesday August 23, 2022 (Eastern European Summer Time)

|             |   |
|-------------|---|
| 08:30-09:00 | Opening and Award Ceremony  |
| 09:00-09:45 | <b>Keynote 1 (Room 1)</b> : Dr. Chonggang Wang, InterDigital, Inc., USA   |
| 09:45-10:30 | <b>Keynote 2 (Room 1)</b> : Dr. Alvaro Velasquez, Information Directorate of the Air Force Research Laboratory, USA |
| 10:30-11:00 | Break   |
| 11:00-12:00 |   |
| 12:00-13:00 | Lunch Break   |
| 13:00-14:00 |   |
| 14:00-15:00 | <b>CPSCom-1 (Room 3)</b>  |
| 15:00-15:30 | Break   |
| 15:30-16:30 | <b>CPSCom-2 (Room 3)</b>  |
| 16:30-17:30 | <b>CPSCom-3 (Room 3)</b>  |
| 18:00-19:30 | Reception   |

## Wednesday August 24, 2022 (Eastern European Summer Time)

|             |   |
|-------------|---|
| 09:00-09:45 | <b>Keynote 3</b> : Elisa Bertino, Purdue University, USA                      |
| 09:45-10:30 | <b>Keynote 4</b> : Robert H. Deng, Singapore Management University, Singapore |
| 10:30-11:00 | Break   |
| 11:00-12:00 | <b>CPSCom-4 (Room 3)</b>  |
| 12:00-13:00 | Lunch Break   |
| 13:00-14:00 | <b>CPSCom-5 (Room 3)</b>  |
| 14:00-15:00 | <b>CPSCom-6 (Room 3)</b>  |
| 15:00-15:30 | Break   |
| 15:30-16:30 | <b>CPSCom-7 (Room 3)</b>  |
| 16:30-17:30 | <b>CPSCom-8 (Room 3)</b>  |
| 19:00-21:00 | Banquet   |

## Thursday August 25, 2022 (Eastern European Summer Time)

|             |  |
|-------------|--|
| 09:00-09:45 | <b>Keynote 5 (Room 1)</b> : ?, Aalto University, Finland |
| 09:45-10:45 | <b>CPSCom-9 (Room 3)</b>                                 |
| 10:45-11:15 | Break  |
| 11:15-12:15 | <b>CPSCom-10 (Room 3)</b>                                |
| 12:15-13:30 | Lunch Break  |
| 13:30-14:15 | <b>Invited Talk 1 (Room 1)</b> : Wenjing Lou             |
| 14:15-15:00 | <b>Invited Talk 2 (Room 1)</b> : Honggang Wang           |
| 15:00-15:30 | Break  |
| 15:30-16:15 | <b>Invited Talk 3 (Room 1)</b> : Hua Fang                |
| 16:15-17:00 | <b>Invited Talk 4</b> : Witold Pedrycz                   |
| 17:00-17:30 | Closing Session  |

### CPSCom-1: Edge-Fog-Cloud Computing

**1. #1570814644**: Delay-Outage Probability of Capacity Achieving-Based Task Offloading for Mobile Edge Computing

*Behrouz Maham and Aigerim Ospanova (Nazarbayev University, Kazakhstan)*

**2. #1570815484: Effective task offloading heuristics for minimizing energy consumption in edge computing**  
*Guichang Yin, Runze Chen and Yi Zhang (Nanjing University of Science and Technology, China)*

**3. #1570818161: A Distributed Privacy-Preserving Framework for Deep Learning with Edge-Cloud Computing**

*Fei Dai (Southwest Forestry University, China); Guozhi Liu (Southwest Forestry University, Panlong District, Kunming City, Yunnan Province, China); Bi Huang (Southwest Forestry University, China); Xiaolong Xu (Nanjing University of Information Science and Technology, China); Chaochao Chen (Zhejiang University, China); Zhangbing Zhou (Institute Telecom, France); Xiaokang Zhou (Shiga University, Japan)*

**4. #1570805631: Edge Computing with Relaying for Task Offloading under Nakagami-m Fading Channels**  
*Aigerim Ospanova and Behrouz Maham (Nazarbayev University, Kazakhstan)*

## CPSCom-2: Networks and Communications for CPSS

**1. #1570800335: Securing uRLLC in UAV-assisted NOMA Wireless Network**

*Shanchao Zheng, Kan Yu, Guangshun Li and Xiaowu Liu (Qufu Normal University, China)*

**2. #1570801065: Investigating Low-Battery Anxiety of Mobile Users**

*Yu Zhang (The Chinese University of Hong Kong, Hong Kong); Guoming Tang (Peng Cheng Laboratory, China); Qianyi Huang (Southern University of Science and Technology & Peng Cheng Laboratory, China); Kui Wu (University of Victoria, Canada); Yangjing Wu (The Chinese University of Hong Kong, Hong Kong); Yi Wang (Southern University of Science and Technology, China)*

**3. #1570808407: A Multipath Source Location Privacy Protection Scheme in Wireless Sensor Networks via Proxy Node**

*Jing Sun (Guizhou University, China); Yuling Chen (Gui Zhou University, China); Xiao Lv (Guizhou Shuanhui Big Data Industry Development Co., Ltd, China); Xiaobin Qian (Guizhou CoVision Science & Technology Co., Ltd, China)*

**4. #1570809300: A Density-based Controller Placement Algorithm for Software Defined Networks**

*Jue Chen, Yujie Xiong and Dun He (Shanghai University of Engineering Science, China)*

## CPSCom-3: Smart City and Smart World

**1. #1570801045: More Behind Your Electricity Bill: a Dual-DNN Approach to Non-Intrusive Load Monitoring**

*Yu Zhang (The Chinese University of Hong Kong, Hong Kong); Guoming Tang (Peng Cheng Laboratory, China); Qianyi Huang (Southern University of Science and Technology & Peng Cheng Laboratory, China); Yi Wang (Southern University of Science and Technology, China); Hong Xu (The Chinese University of Hong Kong, Hong Kong); Xudong Wang (The Chinese University of Hong Kong, Shenzhen, China)*

**2. #1570815288: Construct Digital Twin Models in Cyber Space for Physical Objects of Intelligent Optical Network**

*Liwei Kuang (FiberHome Telecommunication Technologies Co., Ltd., China); Jun Wu (Fiberhome Telecommunication Technologies Co., Ltd, China); Shan Yin (FiberHome Telecommunication Technologies Co.,*

LTD, China)

**3. #1570817415: Prediction of water quality factors for sea cucumber farming based on Dual-Assisted prediction model**

*XiaoMei Li, Huan Liu, Rongli Gai and Zumin Wang (Dalian University, China)*

**4. #1570817444: A Combined Model for Cherry Greenhouse Temperature Prediction Based on LMD and Attention Mechanism**

*Zumin Wang, Tianyu Li, Min Xu, Wei Xu, Yan Liu, Lingyan Hu and Rongli Gai (Dalian University, China)*

## **CPSCom-4: Security and Privacy Preservation**

**1. #1570811762: A Survey on Data Security in Network Storage Systems**

*Hongke Zhang (Xidian University, China); Zheng Yan (Xidian University & Aalto University, China); Xueqin Liang (Xidian University, China)*

**2. #1570806225: A Security Transaction Model Based on HTLC**

*Xiaochuan He and Chaoyue Tan (Guizhou University, China); Yongtang Wu (Weifang University of Science and Technology, China); Yuling Chen (Gui Zhou University, China)*

**3. #1570806984: A Secure Comparison Protocol in the Malicious Model**

*Junhong Tao (Guizhou University, China); Yongtang Wu (Weifang University of Science and Technology, China); Yuling Chen (Gui Zhou University, China)*

**4. #1570807399: A secure multiparty computation round optimization scheme based on Standard Assumption**

*Yun Luo (University of Guizhou, China); Yuling Chen (Gui Zhou University, China); Tao Li (Guizhou University, Guiyang, Guizhou, China); Yilei Wang (Qufu Normal University, China)*

## **CPSCom-5: System-Level Design Methodology**

**1. #1570807471: A Blockchain-based Scalable Electronic Contract Signing System**

*Kaicheng Yang (Guizhou University, China); Yongtang Wu (Weifang University of Science and Technology, China); Yuling Chen (Gui Zhou University, China)*

**2. #1570814759: Data Availability Optimization for Cyber-Physical Systems**

*Liyong Li, Peijin Cong and Junlong Zhou (Nanjing University of Science and Technology, China); Zonghua Gu (Umeå University, Sweden University, Sweden); Keqin Li (State University of New York at New Paltz, USA)*

**3. #1570806457: A K-anonymity Optimization Algorithm Under Attack Model**

*Manxiang Yang (GuiZhou University, China); Yongtang Wu (Weifang University of Science and Technology, China); Yuling Chen (Gui Zhou University, China)*

**4. #1570806733: The Optimal Attack-defense Scheme for Secret Sharing**

*Juan Ma (Guizhou University, China); Yuling Chen (Gui Zhou University, China); Xiao Lv (Guizhou Shuanhui Big Data Industry Development Co., Ltd, China); Xiaobin Qian (Guizhou CoVision Science & Technology Co., Ltd, China)*

## CPSCom-6: Knowledge Systems for CPSS

### 1. #1570814868: Embedded Fault Diagnosis Expert System: Framework, Development Platform, Algorithms and Experiments

*Dapeng Tan, Tong Wang and Chengyan Wang (Zhejiang University of Technology, China)*

### 2. #1570797448: An effective model-free Gaussian Process based online social media recommendation

*Jiawei Xu (Nanjing University of Posts and Telecommunications, China); Yufeng Wang (Nanjing University of Posts and Telecommunications, China); Jianhua Ma (Hosei University, Japan); Qun Jin (Waseda University, Japan)*

### 3. #1570807506: Fruit and Vegetable Picking Robot Movement Planning: A Review

*Rongli Gai and Xiaohong Wang (Dalian University, China); Zhiyuan Chang (Dalian University, China); Yitong Guo (Dalian, Liaoning Province, China)*

### 4. #1570815905: Bayesian Network Based on Dynamic Risk Assessment for Petrochemical Sites-A Case Study of Oil Tanks

*Yanzhi Li (Tianjin University & Tianjin Fire Science and Technology Research Institute of MEM, China); Yuqiao Li (Tianjin Fire Science and Technology Research Institute of MEM, China); Kaifeng Wang (Dalian University, China); Yan Zhang (Tianjin Fire Science and Technology Research Institute of MEM, China); Zumin Wang (Dalian University, China); Shuxue Zhao (Fire and Rescue Corps of Hainan Province, China)*

## CPSCom-7: Deep Learning in CPSS

### 1. #1570815682: Incremental prediction method of optical performance degradation trend based on deep learning

*Shan Yin (FiberHome Telecommunication Technologies Co., LTD, China); Liwei Kuang and Fei Zou (FiberHome Telecommunication Technologies Co., Ltd., China)*

### 2. #1570817533: A Combined Network for Tomato Leaf Disease Recognition Based on the Improved EfficientNet

*XiaoMei Li, Min Xu, Tianyu Li, Wei Xu, Rongli Gai, Lingyan Hu and Zumin Wang (Dalian University, China)*

### 3. #1570806456: TSHML: Token Shuffling under Haircut Policy Based on Machine Learning

*Yilei Wang and Ming Liu (Qufu Normal University, China); Tao Li (Guizhou University, Guiyang, Guizhou, China); Chunmei Li (Qufu Normal University, China); Hui Wang (Ulsan University, Korea (South))*

### 4. #1570817053: Research on rolling bearing fault diagnosis method based on hybrid deep learning network model

*Zhi hao Zhang and Zumin Wang (Dalian University, China)*

## CPSCom-8: Adaptive and Intelligent Systems

### 1. #1570810227: Contactless Elevator Button Action Recognition Based on Passive RFID

*Chengtian Wang, Taochun Wang, Qing Qiu, Chuanxin Zhao and Fulong Chen (Anhui Normal University, China)*

### 2. #1570800484: Beyond 100 Ethical Concerns in the Development of Robot-to-Robot Cooperation



*Rebekah Rousi (University of Vaasa & University of Jyväskylä, Finland); Ville Vakkuri (University of Jyväskylä, Finland); Paulius Daubaris (University of Helsinki, Finland); Simo Linkola (University of Helsinki, Finland); Hooman Samani (University of Plymouth, United Kingdom (Great Britain)); Niko Makitalo (University of Helsinki, Finland); Erika Halme (University of Jyväskylä, Finland); Mamia Agbese (University of Jyväskylä, Finland); Rahul Mohanani (University of Jyväskylä, Finland); Tommi Mikkonen (University of Jyväskylä, Finland); Pekka Abrahamsson (University of Jyväskylä, Finland)*

**3. #1570807503: Investigation on Application of Target Detection in Agriculture**

*Rongli Gai, Kai Wei, Huatian Zhang and Xiang Zhou Kong (Dalian University, China)*

**4. #1570815274: Safety Helmet Wearing Detection Based on A Lightweight YOLOv4 Algorithm**

*Junhua Chen, Sihao Deng, Xueda Huang, Xinrui Yang and Dong Yan (Chongqing University of Posts and Telecommunications, China)*

## **CPSSCom-9: Data-Driven Services in CPSS**

**1. #1570806871: Data Confirmation Scheme based on Auditable CP-ABE**

*Lingyun Zhang and Yuling Chen (State Key Laboratory of Public Big Data, College of Computer Science and Technology, Guizhou University.); Xiaobin Qian (Guizhou CoVision Science & Technology Co., Ltd, China)*

**2. #1570807339: Mining Composite Spatio-Temporal Lifestyle Patterns from Geotagged Social Data**

*Suparna De, Usamah Jassat and Alex Grace (University of Surrey, United Kingdom (Great Britain)); Wei Wang (Xi'an Jiaotong Liverpool University, China); Klaus Moessner (Chemnitz University of Technology, Germany)*

**3. #1570809344: Fixed-time Control for Liquid-filled Flexible Spacecraft**

*Zhihao Zhu and Zhi Gao (Yancheng Institute of Technology, China); Yu Guo (Nanjing University of Science and Technology, China)*

**4. #1570814133: Improved Secure and Efficient Privacy Preserving Provable Data Possession in Cloud Storage**

*Wang Xu An (Engineering University of CAPF, China); Ruifeng Li (Engineering University of PAP, China)*

## **CPSSCom-10: Efficient Architectures for CPSS**

**1. #1570807131: Cyber-Physical Contracts in Offline Regions**

*Lars Creutz (Institute for Software Systems (ISS), Trier University of Applied Sciences, Germany); Kevin Wagner (Trier University of Applied Sciences, Germany); Guido Dartmann (University of Applied Sciences Trier, Germany)*

**2. #1570807483: Overview of Interactive Visualization Methods**

*Rongli Gai, Zhibin Guo and Mengke Li (Dalian University, China)*

**3. #1570816535: Practical Implementation of an OPC UA Multi-Server Aggregation and Management Architecture for IIoT**

*Chenggen Pu (College of Automations & Chongqing University of Posts and Telecommunications, China); Xiwu Ding, Wang Ping and Yifu Yang (Chongqing University of Posts and Telecommunications, China)*

**4. #1570817549: Image Augmentation based on Cross Domain Image Style Transfer**

*Wenshu Li (Zhejiang Sci-Tech University, China); Haijun Mao (China Jiliang University, China)*

# Technical Program of iThings 2022

## Monday August 22, 2022 (Eastern European Summer Time)

|             |                    |
|-------------|--------------------|
| 10:00-12:00 | Registration       |
| 13:00-14:00 |                    |
| 14:00-15:00 |                    |
| 15:00-15:15 | Break              |
| 15:15-16:15 | iThings-7 (Room 3) |
| 16:15-17:15 | iThings-8 (Room 3) |

## Tuesday August 23, 2022 (Eastern European Summer Time)

|             |   |
|-------------|---|
| 08:30-09:00 | Opening and Award Ceremony  |
| 09:00-09:45 | Keynote 1 (Room 1): Dr. Chonggang Wang, InterDigital, Inc., USA   |
| 09:45-10:30 | Keynote 2 (Room 1): Dr. Alvaro Velasquez, Information Directorate of the Air Force Research Laboratory, USA |
| 10:30-11:00 | Break   |
| 11:00-12:00 | iThings-1 (Room 2)  |
| 12:00-13:00 | Lunch Break   |
| 13:00-14:00 | iThings-2 (Room 2)  |
| 14:00-15:00 | iThings-3 (Room 2)  |
| 15:00-15:30 | Break   |
| 15:30-16:30 | iThings-4 (Room 2)  |
| 16:30-17:30 | iThings-5 (Room 2)  |
| 18:00-19:30 | Reception   |

## Wednesday August 24, 2022 (Eastern European Summer Time)

|             |   |
|-------------|---|
| 09:00-09:45 | Keynote 3: Elisa Bertino, Purdue University, USA                      |
| 09:45-10:30 | Keynote 4: Robert H. Deng, Singapore Management University, Singapore |
| 10:30-11:00 | Break   |
| 11:00-12:00 | iThings-6 (Room 2)  |
| 12:00-13:00 | Lunch Break   |
| 13:00-14:00 |   |
| 14:00-15:00 |   |
| 15:00-15:30 | Break   |
| 15:30-16:30 |   |
| 16:30-17:30 |   |
| 19:00-21:00 | Banquet   |

### iThings-1: Invited Talks

1. Talk1: to be updated

2. Talk2: to be updated

### iThings-2: Edge Computing and IoT

1. #1570808000: A Decentralized Framework with Dynamic and Event-Driven Container Orchestration at the Edge

*Umut Can Ozyar (Bogazici University, The Netherlands); Arda Yurdakul (Bogazici University, Turkey)*

**2. #1570808988: Visual Cybersecurity Collaboration and Incident Exchange in Multi-Stakeholder IoT Environments**

*Hanning Zhao and Bilhanan Silverajan (Tampere University, Finland)*

**3. #1570801213: On-Ramp Merging for Connected Autonomous Vehicles using Deep Reinforcement Learning**

*Chinmay S Mahabal (University of Massachusetts Dartmouth, USA); Hua Fang (University of Massachusetts Medical School & Dartmouth, USA); Honggang Wang (University of Massachusetts, Dartmouth & College of Engineering, USA)*

**4. #1570807396: IoT Droplocks: Wireless fingerprint theft using hacked smart locks**

*Steve Kerrison (James Cook University, Singapore)*

### **iThings-3: Deep Learning and IoT**

**1. #1570806109: Reinforcement Learning Based Full Duplex Multi-user MIMO MAC Protocol (RL-MUFD)**

*Zhen Guan, Shengqian Yu, Ya Li and Min He (Yunnan University, China)*

**2. #1570801128: Edge-Cloud Cooperation for DNN Inference via Reinforcement Learning and Supervised Learning**

*Tinghao Zhang (Nanyang Technological University, Singapore); Zhijun Li (Harbin Institute of Technology, China); Yongrui Chen (University of Chinese Academy of Sciences, China); Kwok-Yan Lam and Jun Zhao (Nanyang Technological University, Singapore)*

**3. #1570807889: On-Device Training of Deep Learning Models on Edge Microcontrollers**

*Fabrizio De Vita and Giorgio Nocera (University of Messina, Italy); Dario Bruneo (Universita di Messina, Italy); Valeria Tomaselli and Mirko Falchetto (STMicroelectronics, Italy)*

**4. #1570794290: Reinforcement learning-based IoT sensor scheduling strategy for bridge structure health monitoring**

*Yuan Zhang (University of South China, China); Hengshan Wu (University of south China, China); Lingzhi Yi and Bin Luo (University of South China, China); Yun Qiu (Foshan Highway and Bridge Engineering Monitoring Station Co, China)*

### **iThings-4: Network Deployment and Optimization**

**1. #1570806444: User Position-Based Wireless Sensor Network Deployment Algorithm**

*Fan Liang (Sam Houston State University, USA); Fang Yuan (University of Baltimore, USA); Xing Liu (Towson University, USA)*

**2. #1570806596: A Novel Harmony Search Cat Swarm Optimization Algorithm for Optimal Bridge Sensor Placement**

*Bin Luo and Lingzhi Yi (University of South China, China); Hengshan Wu (University of south China, China); Yun Qiu (Foshan Highway and Bridge Engineering Monitoring Station Co, China); Xiangguang Li (Railway Branch of*

Zhejiang Jiaogong Group Co., Ltd., China); Yuan Zhang (University of South China, China)

**3. #1570803269: Node Deployment and Confidential Information Coverage for WSN-based Air Quality Monitoring**

Yuan Tian, Yihui Sun and Yong Tang (University of South China, China)

## **iThings-5: IoT Systems and Messaging**

**1. #1570809087: Distributed MQTT Brokers at Network Edges: A Study on Message Dissemination**

Luoyao Hao, Xiao Yu, Tingrui Zhang and Henning Schulzrinne (Columbia University, USA)

**2. #1570801037: CleverTrash: an IoT system for waste sorting with deep learning**

Noria Foukia (University of Applied Sciences of Geneva, Switzerland); Swann Puig (University of Applied Sciences of Geneva (HEPIA), Switzerland)

**3. #1570806319: Multi-stage Low Error Localization Based on Krill Herd Optimization Algorithm in WSNs**

Chang Huang and Minghua Wang (University of South China, China)

## **iThings-6: Smart City and Data Exchange**

**1. #1570811170: Privacy-aware Data Fusion and Prediction for Smart City Services in Edge Computing Environment**

Lianyong Qi (Qufu Normal University, China); Xiaoxiao Chi (Macquarie University, Australia); Xiaokang Zhou (Shiga University, Japan); Qi Liu (Nanjing University of Information Science and Technology, China); Fei Dai (Southwest Forestry University, China); Xiaolong Xu (Nanjing University of Information Science & Technology, China); Xuyun Zhang (Macquarie University, Australia)

**2. #1570807565: Identifying Channel Related Vulnerabilities in Zephyr Firmware**

Devansh Rajgarhia (Indian Institute of Technology Kharagpur, India); Peng Liu (Pennsylvania State University, USA); Shamik Sural (IIT Kharagpur, India)

**3. #1570807103: Things Data Interoperability Through Annotating oneM2M resources for NGSI-LD Entities**

Sunil Kumar, SeungMyeong Jeong and Il-Yeop Ahn (Korea Electronics Technology Institute, Korea (South)); Muhammad Aslam Jarwar (University College London, United Kingdom (Great Britain))

## **iThings-7: Workshops – Resource and Task Allocation in IoT Environment**

**1. #1570800882: Demand-Oriented Allocation with Fairness in Multi-Operator Dynamic Spectrum Sharing Systems**

MengYing Wang, Wei Wang, Wenjing Xu and Jiameng Bi (Nanjing University of Aeronautics and Astronautics, China); Qiang Ye (Memorial University of Newfoundland, Canada)

**2. #1570807804: Edge-assisted Puncturable Fine-grained Task Distribution for the IoT-oriented Crowdsensing**

Liquan Jiang and Zhiguang Qin (University of Electronic Science and Technology of China, China)

**3. #1570807507: Research on ultra-wideband (UWB) indoor accurate positioning technology under signal interference**

*Mingming Gong, Zhiyang Li and Wuyungerile Li (Inner Mongolia University, China)*

**iThings-8: Workshops - Data Security for Cloud and Edge**

**1. #1570808129: Achieving Privacy-preserving data sharing for Dual Clouds**

*XingQi Luo (Beijing Institute of Technology, China); Haotian Wang (University of Pennsylvania, USA); Jinyang Dong (Chinese Academy of Military Science, China); Chuan Zhang (Beijing Institute of Technology, China); Tong Wu (Beijing Institute of Technology & Yangtze Delta Region Academy of Beijing Institute of Technology, China)*

**2. #1570807827: Efficient and Secure Collaborative Processing in Mobile Edge Computing via Blockchain**

*Yuwei Le, Yiheng Jiang and Xintong Ling (Southeast University, China); Jiaheng Wang (National Mobile Communications Research Lab, Southeast University, China)*

## Technical Program of IEEE SmartData 2022

### Monday August 22, 2022 (Eastern European Summer Time)

|             |                      |
|-------------|----------------------|
| 10:00-12:00 | Registration         |
| 13:00-14:00 | SmartData-7 (Room 4) |
| 14:00-15:00 | SmartData-8 (Room 4) |
| 15:00-15:15 | Break                |
| 15:15-16:15 |                      |
| 16:15-17:15 |                      |

### Wednesday August 24, 2022 (Eastern European Summer Time)

|             |   |
|-------------|---|
| 09:00-09:45 | Keynote 3: Elisa Bertino, Purdue University, USA                      |
| 09:45-10:30 | Keynote 4: Robert H. Deng, Singapore Management University, Singapore |
| 10:30-11:00 | Break   |
| 11:00-12:00 |   |
| 12:00-13:00 | Lunch Break   |
| 13:00-14:00 | SmartData-1 (Room 2)  |
| 14:00-15:00 | SmartData-2 (Room 2)  |
| 15:00-15:30 | Break   |
| 15:30-16:30 | SmartData-3 (Room 2)  |
| 16:30-17:30 | SmartData-4 (Room 2)  |
| 19:00-21:00 | Banquet   |

### Thursday August 25, 2022 (Eastern European Summer Time)

|             |  |
|-------------|--|
| 09:00-09:45 | Keynote 5 (Room 1): ?, Aalto University, Finland |
| 09:45-10:45 | SmartData-5 (Room 2)                             |
| 10:45-11:15 | Break  |
| 11:15-12:15 | SmartData-6 (Room 2)                             |
| 12:15-13:30 | Lunch Break                                      |
| 13:30-14:15 | Invited Talk 1 (Room 1): Wenjing Lou             |
| 14:15-15:00 | Invited Talk 2 (Room 1): Honggang Wang           |
| 15:00-15:30 | Break  |
| 15:30-16:15 | Invited Talk 3 (Room 1): Hua Fang                |
| 16:15-17:00 | Invited Talk 4: Witold Pedrycz                   |
| 17:00-17:30 | Closing Session                                  |

### SmartData-1: Smart/Big Data Processing and Analytics I

#### 1. #1570801495: IoT Device Friendly Leveled Homomorphic Encryption Protocols

*Marin Matsumoto and Masato Oguchi (Ochanomizu University, Japan)*

#### 2. #1570809827: Theoretical Analysis of QBER for Quantum Key Distribution in 5G Multi-Site Networks

*Jordi Mongay Batalla (Warsaw University of Technology & National Institute of Telecommunications, Poland); Sławomir Sujecki (Military University of Technology, Poland); Houbing Song (Embry-Riddle Aeronautical University, USA); Constandinos X. Mavromoustakis (University of Nicosia & University of Nicosia Research Foundation, Cyprus); Tomasz Wichary (Warsaw University of Technology, Poland)*

#### 3. #1570809935: CNN-Based Emotional Stress Classification Using Smart Learning Dataset

*Andreas Andreou (University of Nicosia Research Foundation, Cyprus); Constandinos X. Mavromoustakis (University of Nicosia & University of Nicosia Research Foundation, Cyprus); Houbing Song (Embry-Riddle Aeronautical University, USA); Jordi Mongay Batalla (Warsaw University of Technology & National Institute of Telecommunications, Poland)*

**4. #1570799608: Semi-Supervised Algorithms in Resource-Constrained Edge Devices: An Overview and Experimental Comparison**

*Mahdi Barhoush, Ahmed Ayad and Anke Schmeink (RWTH Aachen University, Germany)*

## **SmartData-2: Smart/Big Data Processing and Analytics II**

**1. #1570798780: A Self-Supervised Purification Mechanism for Adversarial Samples**

*Bingyi Xie, Honghui Xu, Zuobin Xiong, Yingshu Li and Zhipeng Cai (Georgia State University, USA)*

**2. #1570799431: Performance Assessment of Deep Neural Network on Activity Recognition in WiFi Sensing**

*Jianchao Song, Cheng Qian, Xing Liu, Hengshuo Liang, Chao Lu and Wei Yu (Towson University, USA)*

**3. #1570800185: Information Extraction and Analysis of Chinese Traffic News**

*Xiaoxian Dong, Xiaoxiong Weng and Yancheng Ling (South China University of Technology, China)*

## **SmartData-3: Smart/Big Data Processing and Analytics III**

**1. #1570807925: High Precision Method of Federated Learning Based on Cosine Similarity and Differential Privacy**

*Jia Wang (Shenzhen University, China); Yazheng Li (Zhengzhou University of Industrial Technology, China); Ronghang Ye and Jianqiang Li (Shenzhen University, China)*

**2. #1570800740: Business Process Modeling and Structure Optimization of Resource Coupling in Edge Computing**

*Xiaobo Cai (Yunnan Agricultural University, China)*

**3. #1570806205: Smart Detection of Social Distance Violations using Gaussian Lens Model and Deep Learning**

*Jenny Liu (Spruce Creek High School, USA)*

## **SmartData-4: Smart/Big Data Applications I**

**1. #1570799903: The Data Mining on the Rheological Properties of Asphalt and Mechanical Properties of Asphalt Mixtures**

*Long Xing (CRCC Xinjiang Jin Xin Expressway Cp, Ltd, Xian, China)*

**2. #1570799959: QoS-Aware Joint User Scheduling and Power Allocation for Energy Harvesting Wireless Networks**

*Jun Li and Qinghe Du (Xi'an Jiaotong University, China)*

**3. #1570799960: A Survey of Machine Learning Algorithms and Techniques for Air Mobility Under**



## Emergency Situations

*Yujing Zhou, Dahai Liu and Houbing Song (Embry-Riddle Aeronautical University, USA)*

## SmartData-5: Smart/Big Data Applications II

### 1. #1570806023: EvoSense: Towards Self-Evolving WiFi-Based User Gait Recognition

*Yao Yao, Chengwen Luo, Xingyu Feng, Yijing Huang, Jin Zhang and Jianqiang Li (Shenzhen University, China)*

### 2. #1570806683: A Taxonomy of Security and Defense Mechanisms in Digital Twins-Based Cyber-Physical Systems

*Adamu Hussaini, Cheng Qian, Weixian Liao and Wei Yu (Towson University, USA)*

### 3. #1570807337: How do Programmers Use the Internet? Discovering Domain Knowledge from Browsing and Coding Behaviors

*Ko Watanabe (TU Kaiserslautern, Germany)*

## SmartData-6: Data Science and Its Foundations

### 1. #1570800143: Agricultural Few-Shot Selection by Model Confidences for Multimedia Internet of Things Acquisition Dataset

*Jiachen Yang, Zhuo Zhang and Yang Li (Tianjin University, China)*

### 2. #1570807597: UA-HGAT: Uncertainty-Aware Heterogeneous Graph Attention Network for Short Text Classification

*Deyan Kong and Zhenyan Ji (Beijing Jiaotong University, China); Yanjuan Sang (Blue Intelligence, China); Wei Dong (Institute of Software, Chinese Academy of Sciences, China); Yanyan Yang (Beijing Jiaotong University, China)*

## SmartData-7: Digital Twin and Edge Computing for Cyber Physical System: Communication, Modeling, and Learning (DTEC 2022)

### 1. #1570806749: Reliability Analysis and Optimization for Sensing Data Collection and Processing in New Energy Internet Systems

*Huanjun Hu (Energy Internet Laboratory, China); Jie Wang (School of Electronic Information, WuHan University, China); Jing Wang, Shengwei Wang, Yixi Wang, Yuxuan Ye and Rongtao Liao (Energy Internet Laboratory, China)*

### 2. #1570807036: 3D Human Pose and Shape Estimate from Video

*Xun-Yu Liu (Shenzhen University, China); Lei Wang (Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, China); Xiao-Liang Ma (Shenzhen University, China); Gong-Bin Chen (Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, China); Cheng He (Shenzhen University, China); Jun Cheng (Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, China)*

### 3. #1570807175: Resource Allocation and Computation Offloading in URLLC Systems via Deep Reinforcement Learning

*Jiahui Li, Jiaxin Yan and Baolin Yin (Southwest University of Science and Technology, China); Ran Wei (Hangzhou Terminus Network Technology Co., Ltd., China); Liang Zhao (Southwest University of Science and Technology, China)*

**4. #1570806003: MMC Online Thermal Simulation and Life Prediction Based on Digital Twin Technology**

*Tianlong Xiong (Sichuan Energy Internet Research Institute, Tsinghua University, China); Min Luo (Plexim GmbH, China); Chao Yang, Qing Cheng and Yawen Liu (Sichuan Energy Internet Research Institute, Tsinghua University, China)*

**5. #1570807029: LigNet: Lightweight Hand Tracking for Edge Intelligence**

*Yijing Huang, Chengwen Luo, Xingyu Feng, Zhongru Yang, Jin Zhang and Jianqiang Li (Shenzhen University, China)*

**SmartData-8: Emerging Smart Data Applications in New Power Systems (ESDPS 2022)**

**1. #1570806784: Age Upon Decisions for Low-Latency Services in Internet of Energy Systems**

*Weiqing Yao (Energy Internet Laboratory, China); Zhiwei Bao (School of Electronic Information, Wuhan University, China); Xiao Luo and Jing Wang (Energy Internet Laboratory, China); Jie Wang (School of Electronic Information, Wuhan University, China)*

**2. #1570808409: Short-Dataset-Driven Prediction on Area Electricity Consumption with Adaptive Training Window Selection**

*Jie Wang (School of Electronic Information, Wuhan University, China); Shengwei Wang (Huazhong University of Science and Technology, China); Jing Wang, Huanjun Hu, Yixi Wang, Yuxuan Ye and Rongtao Liao (Energy Internet Laboratory, China)*

## Technical Program of GreenCom 2022

### Monday August 22, 2022 (Eastern European Summer Time)

|             |                     |
|-------------|---------------------|
| 10:00-12:00 | Registration        |
| 13:00-14:00 |                     |
| 14:00-15:00 |                     |
| 15:00-15:15 | Break               |
| 15:15-16:15 | GreenCom-1 (Room 4) |
| 16:15-17:15 | GreenCom-2 (Room 4) |

### Tuesday August 23, 2022 (Eastern European Summer Time)

|             |   |
|-------------|---|
| 08:30-09:00 | Opening and Award Ceremony  |
| 09:00-09:45 | Keynote 1 (Room 1): Dr. Chonggang Wang, InterDigital, Inc., USA   |
| 09:45-10:30 | Keynote 2 (Room 1): Dr. Alvaro Velasquez, Information Directorate of the Air Force Research Laboratory, USA |
| 10:30-11:00 | Break   |
| 11:00-12:00 | GreenCom-3 (Room 3)   |
| 12:00-13:00 | Lunch Break   |
| 13:00-14:00 | GreenCom-4 (Room 3)   |
| 14:00-15:00 |   |
| 15:00-15:30 | Break   |
| 15:30-16:30 |   |
| 16:30-17:30 |   |
| 18:00-19:30 | Reception   |

### GreenCom-1: Smart Energy and Smart Grids

#### 1. #1570800590: Energy Analysts Need a Standard that Interprets the Metro Area Global Information Infrastructure

*Etienne-Victor Depasquale and Saviour Zammit (University of Malta, Malta); Franco R. Davoli (University of Genoa & National Inter-University Consortium for Telecommunications (CNIT), Italy); Raffaele Bolla (University of Genoa, Italy)*

#### 2. #1570822882: On the Benefits of Transfer Learning and Reinforcement Learning for Electric Short-term Load Forecasting

*Yuwei Fu, Di Wu and Benoit Boulet (McGill University, Canada)*

#### 3. #1570811744: A Blockchain-Based Cloud Edge Fusion Computing Platform for the Smart Grid

*Sijie Su, Ying Gao, Yandan Chen and Qiaofeng Pan (South China University of Technology, China); Xiping Hu (Sun Yat-sen University, China)*

#### 4. #1570810684: Influence of Communication Technologies in Smart Grid Power Congestion Management

*Adrien Gougeon (University Rennes, Inria, India); François Lemerrier (CNRS, IRISA, France); Anne Blavette (CNRS, SATIE, France); Anne-Cécile Orgerie (CNRS & IRISA, France)*

### GreenCom-2: AI and Green Society Applications

**1. #1570809150: Energy-Efficient Monitoring of Potential Side Effects from COVID-19 Vaccines**

*Weipeng Deng (The University of Hong Kong, Hong Kong); Edith C.-H. Ngai (The University of Hong Kong & Uppsala University, Hong Kong); Vera van Zoest (Uppsala University, Sweden)*

**2. #1570822863: Making Smart Contract Classification Easier and More Effective**

*Zhirong Zhu, Jianzhong Su, Zigui Jiang, Mingxi Ye and Zibin Zheng (Sun Yat-sen University, China)*

**GreenCom-3: Green Computing and Communication**

**1. #1570800117: Adaptive Sampling for Efficient Acoustic Noise Monitoring: an Incremental Learning Approach**

*Faiga Alawad (Norwegian University of Science and Technology, Norway)*

**2. #1570822861: Energy Consumption Models for UAV Communications: A Brief Tutorial**

*Hua Yan, Shuang-Hua Yang, Yulong Ding (SUSTech, China); Yunfei Chen (University of Warwick, UK)*

**3. #1570822854: Adaptive Federated Learning via Mean Field Approach**

*Kaifei Tu, Shensheng Zheng, Xuehe Wang and Xiping Hu (Sun Yat-sen University, China)*

**GreenCom-4: Invited Talks**

**1. Digitalization of Power Systems and its Security**

*Prof. David Yau, Singapore University of Technology and Design, Singapore*

**2. Data-driven AI services for Smart Buildings: From Application Innovations to Platform Development**

*Prof. Dan Wang, The Hong Kong Polytechnic University, China*

## **Organizing Committees of Cybermatics 2022**

### **Honorary Chairs**

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

Yi Pan, *SIAT, Chinese Academy of Sciences, China*

### **General Co-Chairs**

Raimo Kantola, *Aalto University, Finland*

Witold Pedrycz, *University of Alberta, Canada*

Honggang Wang, *University of Massachusetts Dartmouth, USA*

### **Organization Chair**

Zheng Yan, *Xidian University, China*

### **Program Co-Chairs**

Dapeng Wu, *Chongqing University of Post-telecommunications and Technologies, China*

Xiaokang Wang, *St. Francis Xavier University, Canada*

### **Local Co-Chairs**

Dmitrij Lagutin, *Aalto University, Finland*

Yki Kortnesniemi, *Aalto University, Finland*

### **Steering Chairs**

Jianhua Ma, *Hosei University, Japan*

Laurence T. Yang, *St. Francis Xavier University, Canada*

### **Finance Chair**

Xia Xie, *Hainan University, China*

### **Web Chair**

Jiawei Wang, *St. Francis Xavier University, Canada*

## **Organizing Committees of Blockchain 2022**

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- Valtteri Niemi, *University of Helsinki, Finland*
- Roberto Di Pietro, *Hamad Bin Khalifa University, Qatar*

### **Program Co-Chairs**

- Kim-Kwang Raymond Choo, *University of Texas at San Antonio, USA*
- Willy Susilo, *University of Wollongong, Australia*
- Zheng Yan, *Aalto University, Finland & Xidian University, China*

### **Publication Co-Chairs**

- Xueqin Liang, *Xidian University, China*

### **Workshop and Symposia Co-chairs**

- Zakirul Alam Bhuiyan, *Fordham University, USA*
- Weizhi Meng, *Technical University of Denmark, Denmark*
- Liang Xiao, *Xiamen University, China*

### **Local Co-Chairs**

- Dmitrij Lagutin, *Aalto University, Finland*
- Yki Kortetniemi, *Aalto University, Finland*

### **Publicity Co-Chairs**

- Wei Feng, *Xi'an Jiaotong University, China*
- Sarada Prasad Gochhayat, *Virginia Modeling, Analysis and Simulation Center, USA*

### **Steering Chairs**

- Laurence T. Yang, *St. Francis Xavier University, Canada*
- Zheng Yan, *Aalto University, Finland & Xidian University, China*

### **Web Chair**

- Jiawei Wang, *St. Francis Xavier University, Canada*

## **Organizing Committees of CPSCom 2022**

### **General Chairs**

- Ljiljana Trajkovic, *Simon Fraser University, Canada*
- C.L.Philip Chen, *South China University of Technology, China*
- Omer Rana, *Cardiff University, UK*

### **Program Chairs**

- Parimala Thulasiraman, *University of Manitoba, Canada*
- Lei Ren, *Beihang University, China*
- Lianyong Qi, *Qufu Normal University, China*

### **Program Vice-Chairs**

- Junggab Son, *Kennesaw State University, USA*
- Mamoun Alazab, *Bhuiyan, Charles Darwin University, Australia*
- Jin Sun, *Nanjing University of Science and Technology, China*
- Hu Zhu, *Nanjing University of Posts and Telecommunication, China*

### **Executive Chair**

- Jin Sun, *Nanjing University of Science and Technology, China*

### **Track Chairs**

- Di Wu, *Norwegian University of Science and Technology, Norway*
- Dongdong Huo, *IIE, Chinese Academy of Science, China*
- Gwanggil Jeon, *Incheon National University, Korea*
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