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

Aalto University
School of Electrical Engineering

Sponsored by
IEEE, IEEE Computer Society, IEEE System, Man, and Cybermatics Society,
IEEE Technical Committee on Scalable Computing, IEEE Technical Committee on Cybermatics,
IEEE Technology and Engineering Management Society Technical Committee on Blockchain & Distributed Ledger Technologies

IEEE
IEEE COMPUTER SOCIETY
IEEE SMC Systems, Man, and Cybernetics Society
TCSC IEEE
IEEE SMC TC on CyberMatics
IEEE TEMS Blockchain & Distributed Ledger Technologies

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Presentation Guidelines

Conference Date

The conference is to be held in **Aalto University (TUAS Building, Maarintie 8, Espoo, Finland) 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 your 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://conferences.computer.org/blockchainpub

IEEE iThings/GreenCom/CPSCom/SmartData:
TBA soon.

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

Online and Onsite Conference Venues

The congress will be held in a hybrid way, both onsite with five meeting rooms and online via five zooms. The five zooms correspond to the five rooms, respectively, in the program. You can enter any rooms that you are interested in via the links below:

Room 1: Maarintie 8 / TU1 Saab Auditorium (Online Room 1: https://aalto.zoom.us/j/61389925246)
Room 2: Maarintie 8 / AS3 Saab Space (Online Room 2: https://aalto.zoom.us/j/63433843041)
Room 3: Maarintie 8 / AS4 (Online Room 3: https://aalto.zoom.us/j/62427504007)
Room 4: Maarintie 8 / TU3 Wärtsilä (Online Room 4: https://aalto.zoom.us/j/67131493116)
Room 5: Maarintie 8 / AS6 (Online Room 5: https://aalto.zoom.us/j/63467077013)

For online participation, it is strongly recommended to join 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 **263964** for the online Room 1**, 594776** for the online Room 2**, 197056** for the online Room 3, **291147** for the online Room 4, and **775961** for the online Room 5.
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, you can access google drive below:
https://drive.google.com/drive/folders/1c41yFeGf4sN_Fs3exkD1Av5dcMKOLD0y

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, or Lagutin Dmitrij <dmitrij.lagutin@aalto.fi>; Kortesniemi Yki <yki.kortesniemi@aalto.fi>
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)**			
12:00-13:00	**Lunch Break (TUAS Building Pantry)**			
Room	**AS3 Saab Space (Room 2)**	**AS4 (Room 3)**	**TU3 Wärtsilä (Room 4)**	**AS6 (Room 5)**
13:00-14:00	Blockchain-13 BlockchainEvo (1)	Blockchain-17 FBS (1)	Blockchain-22 BSS (2) + SPB (3)	SmartData-7 DTEC
14:00-15:00	Blockchain-19 BSS (1)	Blockchain-18 FBS (2) + ISBM	Blockchain-14 BlockchainEvo (2)	SmartData-8 ESDPS
15:00-15:15	**Break**			
15:15-16:15	Blockchain-20 SPB (1) + BlockchainEvo (5)	Blockchain-15 BlockchainEvo (3)	iThings-7 Resource and Task Allocation in IoT Environment	GreenCom-1 Smart Energy and Smart Grids
16:15-17:15	Blockchain-16 BlockchainEvo (4)	Blockchain-21 SPB (2)	iThings-8 Data Security for Cloud and Edge	GreenCom-2 AI and Green Society Application

Tuesday August 23, 2022 (Eastern European Summer Time)			
08:30-09:00	**Opening and Award Ceremony (TU1 Saab Auditorium – Room 1)** Chaired by Prof. Raimo Kantola		
09:00-09:45	**Keynote 1 (TU1 Saab Auditorium – Room 1)**: Redactable Blockchain: Technologies, Applications and Future Directions Dr. Chonggang Wang, InterDigital, Inc., USA Chaired by Prof. Wenjing Lou		
09:45-10:30	**Keynote 2 (TU1 Saab Auditorium – Room 1)**: Neurosymbolic Autonomy and the Quest for Smart(er) Decision-Making Dr. Alvaro Velasquez, Information Directorate of the Air Force Research Laboratory, USA Chaired by Prof. Valtteri Niemi		
10:30-11:00	**Break**		
Room	**TU1 Saab Auditorium (Room 1)**	**AS3 Saab Space (Room 2)**	**AS4 (Room 3)**
11:00-12:00	Blockchain-1 Blockchain Applications (1)	iThings-1 Invited Talks	GreenCom-3 Green Computing and Communication
12:00-13:00	**Lunch Break (TUAS Building Pantry)**		
13:00-14:00	Blockchain-2 Blockchain Applications (2)	iThings-2 Edge Computing and IoT	GreenCom-4 Invited Talks
14:00-15:00	Blockchain-3 Blockchain Applications (3)	iThings-3 Deep Learning and IoT	CPSCom-1 Edge-Fog-Cloud Computing
15:00-15:30	**Break**		
15:30-16:30	Blockchain-4 Blockchain Applications (4)	iThings-4 Network Deployment and Optimization	CPSCom-2 Networks and Communications for CPSS

16:30-17:30	Blockchain-5 Blockchain and Artificial Intelligence	iThings-5 IoT Systems and Messaging	CPSCom-3 Smart City and Smart World
18:00-19:30	**Reception (Dipoli, Aalto University)**		
Wednesday August 24, 2022 (Eastern European Summer Time)			
09:00-09:45	**Keynote 3 (TU1 Saab Auditorium – Room 1)**: Privacy and Transparency with Blockchain in the Era of Big Data, Machine Learning, IoT, and 5G Prof. Elisa Bertino, Purdue University, USA Chaired by Prof. Zheng Yan		
09:45-10:30	**Keynote 4 (TU1 Saab Auditorium – Room 1)**: Achieving Cloud Data Security and Privacy in Zero Trust Environments Prof. Robert H. Deng, Singapore Management University, Singapore Chaired by Prof. Kim-Kwang Raymond Choo		
10:30-11:00	**Break**		
Room	**TU1 Saab Auditorium (Room 1)**	**AS3 Saab Space (Room 2)**	**AS4 (Room 3)**
11:00-12:00	Blockchain-6 Blockchain Privacy and Security (1)	iThings-6 Smart City and Data Exchange	CPSCom-4 Security and Privacy Preservation
12:00-13:00	**Lunch Break (TUAS Building Pantry)**		
13:00-14:00	Blockchain-7 Blockchain Privacy and Security (2)	SmartData-1 Smart/Big Data Processing and Analytics (1)	CPSCom-5 System-Level Design Methodology
14:00-15:00	Blockchain-8 Consensus Mechanisms (1)	SmartData-2 Smart/Big Data Processing and Analytics (2)	CPSCom-6 Knowledge Systems for CPSS
15:00-15:30	**Break**		
15:30-16:30	Blockchain-9 Consensus Mechanisms (2)	SmartData-3 Smart/Big Data Processing and Analytics (3)	CPSCom-7 Deep Learning in CPSS
16:30-17:30	Blockchain-10 Blockchain Trust	SmartData-4 Smart/Big Data Applications (1)	CPSCom-8 Adaptive and Intelligent Systems
19:00-22:00	**Gala Dinner (Scandic Grand Central, Vilhonkatu 13, 00100 Helsinki)**		

Thursday August 25, 2022 (Eastern European Summer Time)			
09:00-09:45	**Keynote 5 (TU1 Saab Auditorium – Room 1)**: Cyber-Physical Engineering of Industrial Automation Systems Prof. Valeriy Vyatkin, Aalto University, Finland & Luleå University of Technology, Sweden Chaired by Prof. Raimo Kantola		
Room	**TU1 Saab Auditorium (Room 1)**	**AS3 Saab Space (Room 2)**	**AS4 (Room 3)**
09:45-10:45	Blockchain-11 Blockchain Optimization	SmartData-5 Smart/Big Data Applications (2)	CPSCom-9 Data-Driven Services in CPSS
10:45-11:15	**Break**		
11:15-12:15	Blockchain-12 Performance Analysis and Optimization	SmartData-6 Data Science and Its Foundations	CPSCom-10 Efficient Architectures for CPSS
12:15-13:30	**Lunch Break (TUAS Building Pantry)**		
13:30-14:15	**Invited Talk 1 (TU1 Saab Auditorium – Room 1)**: Blockchain Enabled Novel Applications Prof. Wenjing Lou, Virginia Polytechnic Institute and State University, USA Chaired by Prof. Raimo Kantola		
14:15-15:00	**Invited Talk 2 (TU1 Saab Auditorium – Room 1)**: IoT for Connected Health Prof. Honggang Wang, University of Massachusetts Dartmouth, USA Chaired by Prof. Roberto Di Pietro		

15:00-15:30	**Break**
15:30-16:15	**Invited Talk 3 (TU1 Saab Auditorium – Room 1)**: Towards Real-Time Machine Learning for Digital Trials and Precision Health: Intelligent Behavioral Trajectory Pattern Recognition Prof. Hua Fang, University of Massachusetts Dartmouth, USA Chaired by Prof. Valtteri Niemi
16:15-17:00	**Invited Talk 4 (TU1 Saab Auditorium – Room 1)**: Advancing Agenda of Green and Granular Machine Learning: Developments in Knowledge Transfer, and Knowledge Distillation Prof. Witold Pedrycz, University of Alberta, Canada Chaired by Prof. Zheng Yan
17:00-17:30	**Closing Session (TU1 Saab Auditorium – Room 1)**

Welcome Message from the Congress Chairs

Advances in computers, data, networks and communications are bringing a digital cyber world to our daily lives. Numerous digital things or cyber entities are connected in the cyber world. Meanwhile, countless real things in the conventional physical, social and mental worlds will possess cyber mappings or cyber components, to have a cyber existence in the cyber world. Cyberization is an emerging trend forming the new cyber world and reforming conventional worlds towards cyber-enabled hyper worlds. Cybermatics aims to build systematic knowledge, theories and technologies about new phenomena, behaviours, properties and practices in the cyberspace, cyberization and cyber-enabled hyper worlds. Cybermatics is characterized by not only catching up with human intelligence through sensing and monitoring for intelligent decision making, control, and management, but also learn from the nature-inspired attributes such as dynamics, self-adaptability, and energy saving, towards decentralized trustworthy management across various systems and domains.

The IEEE Cybermatics Congress originated from the 2013 World Cybermatics Congress (Beijing, China). Cybermatics 2022 in Espoo, Finland is the continuation after the success of Cybermatics 2021 in Melbourne, Cybermatics 2020 in Rhodes Island, Cybermatics 2019 in Atlanta, Cybermatics 2018 in Halifax, Cybermatics 2017 in Exeter, Cybermatics 2016 in Chengdu, Cybermatics 2015 in Sydney, and Cybermatics 2014 in Taipei. IEEE Cybermatics 2022 aims to provide a high-profile platform for researchers and engineers to exchange and explore state-of-art innovations and their applications in physical, social and mental worlds.

The congress consists of the following 5 co-located conferences:

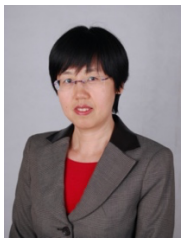
- The 5th IEEE International Conference on Blockchain (Blockchain 2022)
- The 15th IEEE International Conference on Cyber, Physical and Social Computing (CPSCom 2022)
- The 15th IEEE International Conference on Internet of Things (iThings 2022)
- The 8th IEEE International Conference on Smart Data (SmartData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

An international conference can be organized by supports and great voluntary efforts of many people and organizations. Our main responsibility is to coordinate various tasks with other willing and talented volunteers. We would like to thank all general chairs of the above 5 conferences for their successful organization and all program chairs for making the excellent four-day technical programs. We also would like to express our appreciation for the excellent local team for their wonderful local arrangement and the detailed registration work. We also would like to take the opportunity to thank all the members of the organizing committee, the publication chairs, workshop chairs, publicity chairs, web chairs and technical program committee as well as all authors and reviewers who contributed to the conferences.

We deeply appreciate the distinguished congress keynote speakers and invited talkers for sharing with us their latest research advances. Last but not the least, the support from IEEE, IEEE Computer Society, IEEE System, Man and Cybernetics Society, IEEE CS Technical Committee on Scalable Computing (TCSC), IEEE SMC Technical Committee on Cybermatics, and IEEE Technology and Engineering Management Society Technical Committee on Blockchain & Distributed Ledger Technologies is highly appreciated.

We hope you find the congress a stimulating and exciting forum.

Raimo Kantola, Professor
General Chair of 2022 IEEE Cybermatics Congress
Aalto University, Finland



Zheng Yan, Professor
Organization Chair of 2022 IEEE Cybermatics Congress
Steering co-Chair of IEEE Blockchain
Xidian University, China

Congress Keynotes and Invited Talks

Keynote 1: Chonggang Wang, InterDigital, Inc., USA.

Redactable Blockchain: Technologies, Applications and Future Directions

Keynote 2: Alvaro Velasquez, Information Directorate of the Air Force Research Laboratory, USA.

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

Keynote 3: Elisa Bertino, Purdue University, USA.

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

Keynote 4: Robert H. Deng, Singapore Management University, Singapore.

Achieving Cloud Data Security and Privacy in Zero Trust Environments

Keynote 5: Valeriy Vyatkin, Aalto University, Finland & Luleå University of Technology, Sweden.

Cyber-Physical Engineering of Industrial Automation Systems

Invited Talk 1: Wenjing Lou, Virginia Polytechnic Institute and State University, USA.

Blockchain Enabled Novel Applications

Invited Talk 2: Honggang Wang, University of Massachusetts Dartmouth, USA.

IoT for Connected Health

Invited Talk 3: Hua Fang, University of Massachusetts Dartmouth, USA.

Towards Real-Time Machine Learning for Digital Trials and Precision Health: Intelligent Behavioral Trajectory Pattern Recognition

Invited Talk 4: Witold Pedrycz, University of Alberta, Canada.

Advancing Agenda of Green and Granular Machine Learning: Developments in Knowledge Transfer, and Knowledge Distillation

Keynote 1: ***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.

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.

Keynote 2: ***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.

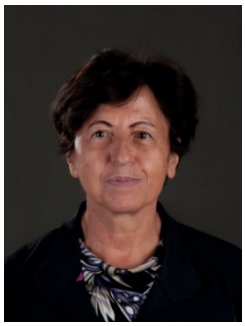
Summary:

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.

Keynote 3: ***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.

Keynote 4: ***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.

Keynote 5: ***Cyber-Physical Engineering of Industrial Automation Systems***

Valeriy Vyatkin, Aalto University, Finland & Luleå University of Technology, Sweden.

About the Keynote Speaker

Valeriy Vyatkin, Professor of Information and Computer Engineering in Automation at Aalto University, Finland on joint appointment as Chaired Professor (Ämnesföreträdare) of Dependable Computation and Communication Systems, Luleå University of Technology, Luleå, Sweden. He has been leading research projects related to software and systems engineering for cyber-physical automation systems, intelligent energy, logistics and transportation, addressing such aspects as dependability, distributed architectures and multi-agent systems applied in various industry sectors: SmartGrid, material handling, datacentres, building management systems and reconfigurable manufacturing, funded by the National Science Foundation (USA), Vettenskap Råd (Sweden), Academy of Sciences (Finland), various national and private agencies in Japan, Germany, New Zealand, Sweden, Finland and the EU. Valeriy co-authored nearly 400 publications. He is an IEEE Fellow, currently serving as Vice-President for Technical Activities of Industrial Electronics Society of IEEE.

Summary:

Flexibility and reconfigurability of factories are the key enablers of their market adaptability. As the production facilities are getting more and more IT- and software-intensive, the speed and quality of reconfiguration largely depends on the efficiency of changing the underlying software and ability of factory equipment to inter-operate, exchange software components between each other and interchangeably use hardware platforms of different vendors.

They often talk about Industry 4.0, 5.0, etc., developments, which include the use of wireless communication (5G, 6G, …), autonomous guided vehicles and collaborative robotics, embedded microcontrollers, empowered with artificial intelligence, distributed computing, and decentralized decision-making architectures. According to many sources the software development effort contributes to around 2/3 of the costs in modern automated production plants which makes the engineering of future factory systems the major technical and organisational challenge.

This talk discusses the concept of cyber-physical engineering (CPE) as an attempt to address the impending challenges in the design of automation systems having strong interdependencies between the physical and computational processes that do not allow to effectively model systems within classic paradigms of control engineering or computer science. One of the sources of such mutual influences is the increasing use of wireless communications for the interaction of components of industrial and other technical systems. Embedding miniature computing devices literally into processes also exposes them to various physical influences, e.g., temperature, vibration, radiation, battery charge, etc., due to which the results of calculations can vary. CPE assumes the use of languages and means of interdisciplinary modelling at all stages of design, analysis and operation of systems.

The CPE will be illustrated with some solutions and experiences achieved at the Aalto Factory of the Future and LTU AIC-cube labs in the context of recent European projects aligned with the Industry X.0 effort.

Invited Talk 1: ***Blockchain Enabled Novel Applications***

Wenjing Lou, Virginia Polytechnic Institute and State University, USA.

About the Invited Talk Speaker

Wenjing Lou is the W. C. English Endowed Professor of Computer Science at Virginia Tech and a Fellow of the IEEE. She holds a Ph.D. in Electrical and Computer Engineering from the University of Florida. Her research interests cover many topics in the cybersecurity field, with her current research interest focusing on wireless networks, privacy protection in machine learning systems, and security and privacy problems in the Internet of Things (IoT) systems. Prof. Lou is a highly cited researcher by the Web of Science Group. She received the Virginia Tech Alumni Award for Research Excellence in 2018, the highest university-level faculty research award. She received the INFOCOM Test-of-Time paper award in 2020. She is the TPC chair for IEEE INFOCOM 2019 and ACM WiSec 2020. She was the Steering Committee Chair for IEEE CNS conference from 2013 to 2020. She is currently a steering committee member of IEEE INFOCOM and IEEE Transactions on Mobile Computing. She served as a program director at US National Science Foundation (NSF) from 2014 to 2017.

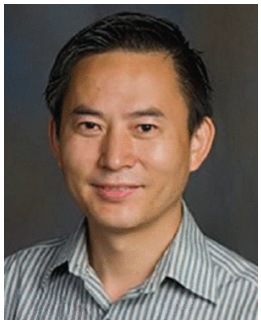
Summary:

This talk will introduce two novel applications enabled by blockchain and smart contract technologies. The first one is data usage control. We propose PrivacyGuard, a security platform that combines blockchain smart contract and hardware trusted execution environment (TEE) to enable individual data owner's fine-grained control over the usage (e.g., which operation, who can use on what condition/price) of their private data. In contrast to data access control, PrivacyGuard is designed for data usage control to prevent the secondhand misuse of user data, as happened in the Facebook-Cambridge Analytica data scandal. The second application we will introduce is a Blockchain-based Decentralized Spectrum Access System (BD-SAS) in the 5G/nextG era. In contrast to the currently deployed centralized SAS, BD-SAS provides SAS service efficiently to spectrum users and enables automated inter-SAS synchronization, without assuming mutual trust among individual SAS administrators.

Invited Talk 2: *IoT for Connected Health*

Honggang Wang, University of Massachusetts Dartmouth, USA.

About the Invited Talk Speaker



Honggang Wang is a professor of Electrical and Computer Engineering at UMass Dartmouth. His research interests include Internet of Things and its applications in health and transportation (e.g., autonomous vehicles) domains, Machine Learning and Big Data, Multimedia and Cyber Security, Smart and Connected Health, Wireless Networks and Multimedia Communications. He has produced a body of high-quality publications in prestigious journals and conferences in his research areas, winning prestigious best paper awards six times, including Globecom'19 and WCNC'08. He serves as the steering committee and founding Co-chair of IEEE/ACM Conference on Connected Health (CHASE) and TPC co-chair of IEEE CHASE 2016, which is a leading international conference in the field of connected health. He has also been serving as the Editor in Chief (EiC) for IEEE Internet of Things journal since 2020. He was the past Chair (2018-2020) of IEEE Multimedia Communications Technical Committee and the Chair of IEEE eHealth Committee (2020-2021). He is an IEEE Distinguished Lecturer and an IEEE Fellow for his contribution to low power wireless for IoT and Multimedia Applications.

Summary:

Smart and Connected Health (SCH) is the use of Internet, sensing, communications and intelligent techniques in support of healthcare applications. Internet of Things (IoT) systems such as Wireless body area network (WBAN) system with various types of biomedical sensors is one of key infrastructures of SCH and provide an opportunity to address issues in rapidly increasing mHealth/eHealth applications. However, there are significant challenges in this area, such as improving the performance of WBANs, analytics of large and continuous physiological data collected from biomedical sensors and predictive modeling, and securing data transmission and protecting data privacy, especially in mobile and wireless environments. In this talk, I will focus on the introduction of two case studies: (1) developing a wearable biosensor system for the remote detection of life-threatening events in infants; (2) a security system to support reliable and secured data transmissions over WBANs.

Invited Talk 3: ***Towards Real-Time Machine Learning for Digital Trials and Precision Health: Intelligent Behavioral Trajectory Pattern Recognition***

Hua Fang, University of Massachusetts Dartmouth, USA.

About the Invited Talk Speaker

Dr. Hua Fang is a tenured Professor in the Department of Computer and Information Science, and in the Department of Mathematics (Secondary), and a member of the Steering Committee of Data Science Program at the University of Massachusetts Dartmouth. Dr. Fang is also an adjunct Professor in the Division of Biostatistics and Health Services Research, University of Massachusetts Medical School (UMMS). She is the founder of the Computational Statistics and Data Science lab at UMass. Dr. Fang specializes in behavioral trajectory pattern recognition and missing data analyses in longitudinal studies. Her current research interests include machine or statistical learning of wearable biosensor data, broadly in digital health and the Internet of Things. As PI or Co-I, she has sustained continuous funding from US federal agencies, e.g., NIH and NSF, for about 15 years. Currently, Dr. Fang is leading her second NIH R01 computational project as the PI and multiple NSF projects as PI or Co-PI. She has served on several renowned IEEE editorial boards such as IEEE IoT, IEEE transactions on big data, and technical program committees of top ACM/IEEE and international conferences on data mining and connected health, e.g., ACM KDD, IEEE ICDM, ACM/IEEE CHASE, IJCAI, SDM. Dr. Fang also served as a member of IEEE Standards Association (SA) Healthcare Life Science Practice Program Advisory Group and IEEE HEALTHCOM Steering Committee.

Summary:

This talk will introduce our NIH-funded intelligent behavioral trajectory pattern recognition projects in the context of longitudinal randomized controlled trials (RCT) and observational studies. The newly developed model and tool that contribute to this funded project and a recently awarded patent will be demonstrated using the longitudinal RCT data and simulation. The reproducibility of these methods will be discussed in a broader context of digital health and precision health. The team's ongoing research for real-time machine learning of biosensor streaming data will also be covered. Future directions and challenges in these areas will be discussed.

Invited Talk 4: ***Advancing Agenda of Green and Granular Machine Learning: Developments in Knowledge Transfer, and Knowledge Distillation***

Witold Pedrycz, University of Alberta, Canada.

About the Invited Talk Speaker

Witold Pedrycz (IEEE Life Fellow) is Professor in the Department of Electrical and Computer Engineering, University of Alberta, Edmonton, Canada. He is also with the Systems Research Institute of the Polish Academy of Sciences, Warsaw, Poland. Dr. Pedrycz is a foreign member of the Polish Academy of Sciences and a Fellow of the Royal Society of Canada. He is a recipient of several awards including Norbert Wiener award from the IEEE Systems, Man, and Cybernetics Society, IEEE Canada Computer Engineering Medal, a Cajastur Prize for Soft Computing from the European Centre for Soft Computing, a Killam Prize, a Fuzzy Pioneer Award from the IEEE Computational Intelligence Society, and 2019 Meritorious Service Award from the IEEE Systems Man and Cybernetics Society. His main research directions involve Computational Intelligence, Granular Computing, and Machine Learning, among others. Dr. Pedrycz is involved in editorial activities. He is an Editor-in-Chief of Information Sciences, Editor-in-Chief of WIREs Data Mining and Knowledge Discovery (Wiley), and Co-editor-in-Chief of Int. J. of Granular Computing (Springer) and J. of Data Information and Management (Springer).

Summary:

Green Machine Learning (also referred to as Green AI) has recently emerged as an interesting and application-oriented endeavour. It stresses a genuine need for a holistic multicriteria assessment of the design practices of Machine Learning architectures by involving computing overhead (and associated carbon footprint), interpretability, and robustness, among others.

Knowledge transfer is about a thoughtful and prudently arranged knowledge reuse to support energy-aware Machine Learning computing. Rather than starting from scratch, the existing experience (model) gathered in a source domain is transferred to the target domain. We discuss passive and active modes of knowledge transfer. In both modes, the essential role of information granularity is identified. The passive approach leads to the construction of a granular model in the target domain on a basis of the original model coming from the source domain where information granularity of the model serves as a vehicle to quantify the credibility of the transferred knowledge. In the active approach, a new model is constructed in the target domain whereas the design is guided by the loss function, which involves granular regularization produced by the granular model transferred from the source domain. A generalized scenario of multi-source domains is discussed. Knowledge distillation leading to model compression is studied in the context of transfer learning.

We advocate that in order to conveniently address the quest of green machine learning, it becomes beneficial to engage the fundamental framework of Granular Computing. We demonstrate that various ways of

conceptualization of information granules in terms of fuzzy sets, sets, rough sets, and others may lead to efficient solutions.

To proceed with a detailed discussion, a concise information granules-oriented design of rule-based architectures is outlined. An information granules-oriented design of rule-based architectures in transfer learning and knowledge distillation is used for illustrative purposes.

Technical Program of IEEE Blockchain 2022

Monday August 22, 2022 (Eastern European Summer Time)			
10:00-16:00	**Registration (also on August 23 and 24, 2022)**		
12:00-13:00	**Lunch Break (TUAS Building Pantry)**		
Room	**AS3 Saab Space (Room 2)**	**AS4 (Room 3)**	**TU3 Wärtsilä (Room 4)**
13:00-14:00	Blockchain-13 BlockchainEvo (1)	Blockchain-17 FBS (1)	Blockchain-22 BSS (2) + SPB (3)
14:00-15:00	Blockchain-19 BSS (1)	Blockchain-18 FBS (2) + ISBM	Blockchain-14 BlockchainEvo (2)
15:00-15:15	**Break**		
15:15-16:15	Blockchain-20 SPB (1) + BlockchainEvo (5)	Blockchain-15 BlockchainEvo (3)	
16:15-17:15	Blockchain-16 BlockchainEvo (4)	Blockchain-21 SPB (2)	

Tuesday August 23, 2022 (Eastern European Summer Time)	
08:30-09:00	**Opening and Award Ceremony (TU1 Saab Auditorium – Room 1)** Chaired by Prof. Raimo Kantola
09:00-09:45	**Keynote 1 (TU1 Saab Auditorium – Room 1)**: Redactable Blockchain: Technologies, Applications and Future Directions Dr. Chonggang Wang, InterDigital, Inc., USA Chaired by Prof. Wenjing Lou
09:45-10:30	**Keynote 2 (TU1 Saab Auditorium – Room 1)**: Neurosymbolic Autonomy and the Quest for Smart(er) Decision-Making Dr. Alvaro Velasquez, Information Directorate of the Air Force Research Laboratory, USA Chaired by Prof. Valtteri Niemi
10:30-11:00	**Break**
Room	**TU1 Saab Auditorium (Room 1)**
11:00-12:00	Blockchain-1 Blockchain Applications (1)
12:00-13:00	**Lunch Break (TUAS Building Pantry)**
13:00-14:00	Blockchain-2 Blockchain Applications (2)
14:00-15:00	Blockchain-3 Blockchain Applications (3)
15:00-15:30	**Break**
15:30-16:30	Blockchain-4 Blockchain Applications (4)
16:30-17:30	Blockchain-5 Blockchain and Artificial Intelligence
18:00-19:30	**Reception (Dipoli, Aalto University)**

Wednesday August 24, 2022 (Eastern European Summer Time)	
09:00-09:45	**Keynote 3 (TU1 Saab Auditorium – Room 1)**: Privacy and Transparency with Blockchain in the Era of Big Data, Machine Learning, IoT, and 5G Prof. Elisa Bertino, Purdue University, USA Chaired by Prof. Zheng Yan
09:45-10:30	**Keynote 4 (TU1 Saab Auditorium – Room 1)**: Achieving Cloud Data Security and Privacy in Zero Trust Environments Prof. Robert H. Deng, Singapore Management University, Singapore Chaired by Prof. Kim-Kwang Raymond Choo
10:30-11:00	**Break**
Room	**TU1 Saab Auditorium (Room 1)**
11:00-12:00	Blockchain-6 Blockchain Privacy and Security (1)
12:00-13:00	**Lunch Break (TUAS Building Pantry)**
13:00-14:00	Blockchain-7 Blockchain Privacy and Security (2)
14:00-15:00	Blockchain-8 Consensus Mechanisms (1)

15:00-15:30	**Break**
15:30-16:30	Blockchain-9 Consensus Mechanisms (2)
16:30-17:30	Blockchain-10 Blockchain Trust
19:00-22:00	**Gala Dinner (Scandic Grand Central, Vilhonkatu 13, 00100 Helsinki)**

Thursday August 25, 2022 (Eastern European Summer Time)	
09:00-09:45	**Keynote 5 (TU1 Saab Auditorium – Room 1)**: Cyber-Physical Engineering of Industrial Automation Systems Prof. Valeriy Vyatkin, Aalto University, Finland & Luleå University of Technology, Sweden Chaired by Prof. Raimo Kantola
Room	**TU1 Saab Auditorium (Room 1)**
09:45-10:45	Blockchain-11 Blockchain Optimization
10:45-11:15	**Break**
11:15-12:15	Blockchain-12 Performance Analysis and Optimization
12:15-13:30	**Lunch Break (TUAS Building Pantry)**
13:30-14:15	**Invited Talk 1 (TU1 Saab Auditorium – Room 1)**: Blockchain Enabled Novel Applications Prof. Wenjing Lou, Virginia Polytechnic Institute and State University, USA Chaired by Prof. Raimo Kantola
14:15-15:00	**Invited Talk 2 (TU1 Saab Auditorium – Room 1)**: IoT for Connected Health Prof. Honggang Wang, University of Massachusetts Dartmouth, USA Chaired by Prof. Roberto Di Pietro
15:00-15:30	**Break**
15:30-16:15	**Invited Talk 3 (TU1 Saab Auditorium – Room 1)**: Towards Real-Time Machine Learning for Digital Trials and Precision Health: Intelligent Behavioral Trajectory Pattern Recognition Prof. Hua Fang, University of Massachusetts Dartmouth, USA Chaired by Prof. Valtteri Niemi
16:15-17:00	**Invited Talk 4 (TU1 Saab Auditorium – Room 1)**: Advancing Agenda of Green and Granular Machine Learning: Developments in Knowledge Transfer, and Knowledge Distillation Prof. Witold Pedrycz, University of Alberta, Canada Chaired by Prof. Zheng Yan
17:00-17:30	**Closing Session (TU1 Saab Auditorium – Room 1)**

Blockchain-1: Blockchain Applications (1)
Session Chair: Shushu Liu, Aalto University, Finland

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)
Session Chair: Shushu Liu, Aalto University, Finland

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)
Session Chair: Sourav Kanti Addya, National Institute of Technology Karnataka, Surathkal, India

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: λ- 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)
Session Chair: Sourav Kanti Addya, National Institute of Technology Karnataka, Surathkal, India

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 Vasishta (IIT Kharagpur, India); Balaji Palanisamy (University of Pittsburgh, USA); Shamik Sural (IIT Kharagpur, India)

Blockchain-5: Blockchain and Artificial Intelligence
Session Chair: Valtteri Niemi, University of Helsinki, Finland

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)
Session Chair: Arijit Khan, Aalborg University, Denmark

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)
Session Chair: Masoud Kaveh, Aalto University, Finland

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 Grünewald (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)
Session Chair: Shufan Fei, Xidian University, China

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)
Session Chair: Raju Halder, Indian Institute of Technology Patna, India

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
Session Chair: Volkan Dedeoglu, The Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia

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
Session Chair: Jie Wang, Xidian University, China

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
Session Chair: Wei Feng, Xi'an Jiaotong University, China

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)
Session Chair: Masoud Kaveh, Aalto University, Finland

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

Taegyu 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))

4. #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)

Blockchain-14: BlockchainEvo (2)
Session Chair: Haomeng Xie, Xidian University, China

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

Manika Sharma (International Institute of Information Technology, Hyderbad, 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))

Blockchain-15: BlockchainEvo (3)
Session Chair: Yaxing Chen, Northwestern Polytechnical University, China

1. #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)

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)
Session Chair: Xueqin Liang, Xidian University, China

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); Yinan 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)
Session Chair: Xixun Yu, Hainan University, China

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
Session Chair: Volkan Dedeoglu, The Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia

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
David Mancini (EY Advisory SPA Italy, Italy); Dario Anelli (EY Advisory SPA, Italy)

Blockchain-19: BSS (1)
Session Chair: Shufan Fei, Xidian University, China

1. #1570810701: A Blockchain Implementation for Configurable Multi-Factor Challenge-Set Self-Sovereign Identity Authentication
Alexander Norta (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 Espirito Santo (UFES), Brazil)

Blockchain-20: SPB (1) + BlockchainEvo (5)
Session Chair: Jie Wang, Xidian University, China

1. #1570811260: A Blockchained 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 Espirito Santo (UFES), Brazil), Rodolfo S Villaca (Federal University of Espirito Santo (UFES), Brazil), Roberta Gomes (Federal University of Espirito 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)
Session Chair: Ming Su, Nankai University, China

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)

4. #1570811725: Security Vulnerabilities and Countermeasures of Smart Contracts: A Survey
Epherem Merete Sifra and Gaofei Wu (Xidian University, China); Yuqing Zhang (Graduate University of Chinese Academy of Science, China)

Blockchain-22: BSS (2) + SPB (3)
Session Chair: Haomeng Xie, Xidian University, China

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

Dominik Tomaszuk (University of Bialystok & MakoLab, Poland); Szymon Głąb 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, Hui Ma, Mingchao Ai, Meijie Zha and 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

Monday August 22, 2022 (Eastern European Summer Time)	
10:00-16:00	**Registration (also on Aug. 23 and Aug. 24, 2022)**
12:00-13:00	**Lunch Break (TUAS Building Pantry)**
13:00-14:00	
14:00-15:00	
15:00-15:15	**Break**
15:15-16:15	
16:15-17:15	

Tuesday August 23, 2022 (Eastern European Summer Time)	
08:30-09:00	**Opening and Award Ceremony (TU1 Saab Auditorium – Room 1)** Chaired by Prof. Raimo Kantola
09:00-09:45	**Keynote 1 (TU1 Saab Auditorium – Room 1)**: Redactable Blockchain: Technologies, Applications and Future Directions Dr. Chonggang Wang, InterDigital, Inc., USA Chaired by Prof. Wenjing Lou
09:45-10:30	**Keynote 2 (TU1 Saab Auditorium – Room 1)**: Neurosymbolic Autonomy and the Quest for Smart(er) Decision-Making Dr. Alvaro Velasquez, Information Directorate of the Air Force Research Laboratory, USA Chaired by Prof. Valtteri Niemi
10:30-11:00	**Break**
Room	**AS4 (Room 3)**
11:00-12:00	
12:00-13:00	**Lunch Break (TUAS Building Pantry)**
13:00-14:00	
14:00-15:00	CPSCom-1 Edge-Fog-Cloud Computing
15:00-15:30	**Break**
15:30-16:30	CPSCom-2 Networks and Communications for CPSS
16:30-17:30	CPSCom-3 Smart City and Smart World
18:00-19:30	**Reception (Dipoli, Aalto University)**

Wednesday August 24, 2022 (Eastern European Summer Time)	
09:00-09:45	**Keynote 3 (TU1 Saab Auditorium – Room 1)**: Privacy and Transparency with Blockchain in the Era of Big Data, Machine Learning, IoT, and 5G Prof. Elisa Bertino, Purdue University, USA Chaired by Prof. Zheng Yan
09:45-10:30	**Keynote 4 (TU1 Saab Auditorium – Room 1)**: Achieving Cloud Data Security and Privacy in Zero Trust Environments Prof. Robert H. Deng, Singapore Management University, Singapore Chaired by Prof. Kim-Kwang Raymond Choo
10:30-11:00	**Break**
Room	**AS4 (Room 3)**
11:00-12:00	CPSCom-4 Security and Privacy Preservation
12:00-13:00	**Lunch Break (TUAS Building Pantry)**
13:00-14:00	CPSCom-5 System-Level Design Methodology
14:00-15:00	CPSCom-6 Knowledge Systems for CPSS
15:00-15:30	**Break**
15:30-16:30	CPSCom-7 Deep Learning in CPSS
16:30-17:30	CPSCom-8 Adaptive and Intelligent Systems
19:00-22:00	**Gala Dinner (Scandic Grand Central, Vilhonkatu 13, 00100 Helsinki)**

Thursday August 25, 2022 (Eastern European Summer Time)	
09:00-09:45	Keynote 5 **(TU1 Saab Auditorium – Room 1)**: Cyber-Physical Engineering of Industrial Automation Systems Prof. Valeriy Vyatkin, Aalto University, Finland & Luleå University of Technology, Sweden Chaired by Prof. Raimo Kantola
Room	**AS4 (Room 3)**
09:45-10:45	CPSCom-9 Data-Driven Services in CPSS
10:45-11:15	**Break**
11:15-12:15	CPSCom-10 Efficient Architectures for CPSS
12:15-13:30	**Lunch Break (TUAS Building Pantry)**
13:30-14:15	Invited Talk 1 **(TU1 Saab Auditorium – Room 1)**: Blockchain Enabled Novel Applications Prof. Wenjing Lou, Virginia Polytechnic Institute and State University, USA Chaired by Prof. Raimo Kantola
14:15-15:00	Invited Talk 2 **(TU1 Saab Auditorium – Room 1)**: IoT for Connected Health Prof. Honggang Wang, University of Massachusetts Dartmouth, USA Chaired by Prof. Roberto Di Pietro
15:00-15:30	**Break**
15:30-16:15	Invited Talk 3 **(TU1 Saab Auditorium – Room 1)**: Towards Real-Time Machine Learning for Digital Trials and Precision Health: Intelligent Behavioral Trajectory Pattern Recognition Prof. Hua Fang, University of Massachusetts Dartmouth, USA Chaired by Prof. Valtteri Niemi
16:15-17:00	Invited Talk 4 **(TU1 Saab Auditorium – Room 1)**: Advancing Agenda of Green and Granular Machine Learning: Developments in Knowledge Transfer, and Knowledge Distillation Prof. Witold Pedrycz, University of Alberta, Canada Chaired by Prof. Zheng Yan
17:00-17:30	**Closing Session (TU1 Saab Auditorium – Room 1)**

CPSCom-1: Edge-Fog-Cloud Computing
Session Chair: Jin Sun, Nanjing University of Science and Technology, China

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
Session Chair: Tian Wang, Umea University, Sweden

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
Session Chair: Jian Zhou, Nanjing University of Posts and Telecommunications, China

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
Session Chair: Kun Cao, Jinan University, China

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
Session Chair: Jing Yang, Hainan University, China

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
Liying 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
Session Chair: Cheng Dai, Sichuan University, China

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 Telecommunicaitons, 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
Session Chair: Yingbing Liu, Hainan University, China

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 Recognization 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
Session Chair: Yi Zhang, Nanjing University of Science and Technology, China

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)

CPSCom-9: Data-Driven Services in CPSS
Session Chair: Tian Wang, Umea University, Sweden

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)

CPSCom-10: Efficient Architectures for CPSS
Session Chair: Yuan Gao, Hainan University, China

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)	
10:00-16:00	**Registration (also on Aug. 23 and Aug. 24, 2022)**
12:00-13:00	**Lunch Break (TUAS Building Pantry)**
Room	**TU3 Wärtsilä (Room 4)**
13:00-14:00	
14:00-15:00	
15:00-15:15	**Break**
15:15-16:15	iThings-7 Resource and Task Allocation in IoT Environment
16:15-17:15	iThings-8 Data Security for Cloud and Edge

Tuesday August 23, 2022 (Eastern European Summer Time)	
08:30-09:00	**Opening and Award Ceremony (TU1 Saab Auditorium – Room 1)** Chaired by Prof. Raimo Kantola
09:00-09:45	**Keynote 1 (TU1 Saab Auditorium – Room 1)**: Redactable Blockchain: Technologies, Applications and Future Directions Dr. Chonggang Wang, InterDigital, Inc., USA Chaired by Prof. Wenjing Lou
09:45-10:30	**Keynote 2 (TU1 Saab Auditorium – Room 1)**: Neurosymbolic Autonomy and the Quest for Smart(er) Decision-Making Dr. Alvaro Velasquez, Information Directorate of the Air Force Research Laboratory, USA Chaired by Prof. Valtteri Niemi
10:30-11:00	**Break**
Room	**AS3 Saab Space (Room 2)**
11:00-12:00	iThings-1 Invited Talks
12:00-13:00	**Lunch Break (TUAS Building Pantry)**
13:00-14:00	iThings-2 Edge Computing and IoT
14:00-15:00	iThings-3 Deep Learning and IoT
15:00-15:30	**Break**
15:30-16:30	iThings-4 Network Deployment and Optimization
16:30-17:30	iThings-5 IoT Systems and Messaging
18:00-19:30	**Reception (Dipoli, Aalto University)**

Wednesday August 24, 2022 (Eastern European Summer Time)	
09:00-09:45	**Keynote 3 (TU1 Saab Auditorium – Room 1)**: Privacy and Transparency with Blockchain in the Era of Big Data, Machine Learning, IoT, and 5G Prof. Elisa Bertino, Purdue University, USA Chaired by Prof. Zheng Yan
09:45-10:30	**Keynote 4 (TU1 Saab Auditorium – Room 1)**: Achieving Cloud Data Security and Privacy in Zero Trust Environments Prof. Robert H. Deng, Singapore Management University, Singapore Chaired by Prof. Kim-Kwang Raymond Choo
10:30-11:00	**Break**
Room	**AS3 Saab Space (Room 2)**
11:00-12:00	iThings-6 Smart City and Data Exchange
12:00-13:00	**Lunch Break (TUAS Building Pantry)**
13:00-14:00	
14:00-15:00	
15:00-15:30	**Break**
15:30-16:30	
16:30-17:30	

19:00-22:00	**Gala Dinner (Scandic Grand Central, Vilhonkatu 13, 00100 Helsinki)**
Thursday August 25, 2022 (Eastern European Summer Time)	
09:00-09:45	**Keynote 5 (TU1 Saab Auditorium – Room 1)**: Cyber-Physical Engineering of Industrial Automation Systems Prof. Valeriy Vyatkin, Aalto University, Finland & Luleå University of Technology, Sweden Chaired by Prof. Raimo Kantola
09:45-10:45	
10:45-11:15	**Break**
11:15-12:15	
12:15-13:30	**Lunch Break (TUAS Building Pantry)**
13:30-14:15	**Invited Talk 1 (TU1 Saab Auditorium – Room 1)**: Blockchain Enabled Novel Applications Prof. Wenjing Lou, Virginia Polytechnic Institute and State University, USA Chaired by Prof. Raimo Kantola
14:15-15:00	**Invited Talk 2 (TU1 Saab Auditorium – Room 1)**: IoT for Connected Health Prof. Honggang Wang, University of Massachusetts Dartmouth, USA Chaired by Prof. Roberto Di Pietro
15:00-15:30	**Break**
15:30-16:15	**Invited Talk 3 (TU1 Saab Auditorium – Room 1)**: Towards Real-Time Machine Learning for Digital Trials and Precision Health: Intelligent Behavioral Trajectory Pattern Recognition Prof. Hua Fang, University of Massachusetts Dartmouth, USA Chaired by Prof. Valtteri Niemi
16:15-17:00	**Invited Talk 4 (TU1 Saab Auditorium – Room 1)**: Advancing Agenda of Green and Granular Machine Learning: Developments in Knowledge Transfer, and Knowledge Distillation Prof. Witold Pedrycz, University of Alberta, Canada Chaired by Prof. Zheng Yan
17:00-17:30	**Closing Session (TU1 Saab Auditorium – Room 1)**

iThings-1: Invited Talks
Session Chair: Rong Gu, Nanjing University, China

1. Talk1: IoT meets AI: Human-cyber-physical Fused Smart-IoT Sensing

Xiulong Liu, Professor, College of Intelligence and Computing, Tianjin University, China

2. Talk2: Crowd Sensing 2.0: A Preliminary Exploration

Dong Zhao, Professor, Beijing University of Posts and Telecommunications, China

iThings-2: Edge Computing and IoT
Session Chair: Zheng Chang, University of Jyväskylä, Finland

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
Session Chair: Zhufang Kuang, Central South University of Forestry and Technology, China

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
Session Chair: Zichuan Xu, Dalian University of Technology, China

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 Confident 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
Session Chair: Pengzhan Zhou, Chongqing University, China

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
Session Chair: Muhammad Faizan Khan, The University of Haripur, Pakistan

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
Session Chair: Fuqiang Gu, Chongqing University, China

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
Session Chair: Dian Shen, Southeast University, China

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)	
10:00-16:00	**Registration (also on Aug. 23 and Aug. 24, 2022)**
12:00-13:00	**Lunch Break (TUAS Building Pantry)**
Room	**AS6 (Room 5)**
13:00-14:00	SmartData-7 DTEC
14:00-15:00	SmartData-8 ESDPS
15:00-15:15	**Break**
15:15-16:15	
16:15-17:15	

Tuesday August 23, 2022 (Eastern European Summer Time)	
08:30-09:00	**Opening and Award Ceremony (TU1 Saab Auditorium – Room 1)** Chaired by Prof. Raimo Kantola
09:00-09:45	**Keynote 1 (TU1 Saab Auditorium – Room 1)**: Redactable Blockchain: Technologies, Applications and Future Directions Dr. Chonggang Wang, InterDigital, Inc., USA Chaired by Prof. Wenjing Lou
09:45-10:30	**Keynote 2 (TU1 Saab Auditorium – Room 1)**: Neurosymbolic Autonomy and the Quest for Smart(er) Decision-Making Dr. Alvaro Velasquez, Information Directorate of the Air Force Research Laboratory, USA Chaired by Prof. Valtteri Niemi
10:30-11:00	**Break**
11:00-12:00	
12:00-13:00	**Lunch Break (TUAS Building Pantry)**
13:00-14:00	
14:00-15:00	
15:00-15:30	**Break**
15:30-16:30	
16:30-17:30	
18:00-19:30	**Reception (Dipoli, Aalto University)**

Wednesday August 24, 2022 (Eastern European Summer Time)	
09:00-09:45	**Keynote 3 (TU1 Saab Auditorium – Room 1)**: Privacy and Transparency with Blockchain in the Era of Big Data, Machine Learning, IoT, and 5G Prof. Elisa Bertino, Purdue University, USA Chaired by Prof. Zheng Yan
09:45-10:30	**Keynote 4 (TU1 Saab Auditorium – Room 1)**: Achieving Cloud Data Security and Privacy in Zero Trust Environments Prof. Robert H. Deng, Singapore Management University, Singapore Chaired by Prof. Kim-Kwang Raymond Choo
10:30-11:00	**Break**
Room	**AS3 Saab Space (Room 2)**
11:00-12:00	
12:00-13:00	**Lunch Break (TUAS Building Pantry)**
13:00-14:00	SmartData-1 Smart/Big Data Processing and Analytics (1)
14:00-15:00	SmartData-2 Smart/Big Data Processing and Analytics (2)
15:00-15:30	**Break**
15:30-16:30	SmartData-3 Smart/Big Data Processing and Analytics (3)
16:30-17:30	SmartData-4 Smart/Big Data Applications (1)
19:00-22:00	**Gala Dinner (Scandic Grand Central, Vilhonkatu 13, 00100 Helsinki)**

Thursday August 25, 2022 (Eastern European Summer Time)	
09:00-09:45	Keynote 5 **(TU1 Saab Auditorium – Room 1)**: Cyber-Physical Engineering of Industrial Automation Systems Prof. Valeriy Vyatkin, Aalto University, Finland & Luleå University of Technology, Sweden Chaired by Prof. Raimo Kantola
Room	**AS3 Saab Space (Room 2)**
09:45-10:45	SmartData-5 Smart/Big Data Applications (2)
10:45-11:15	**Break**
11:15-12:15	SmartData-6 Data Science and Its Foundations
12:15-13:30	**Lunch Break (TUAS Building Pantry)**
13:30-14:15	Invited Talk 1 **(TU1 Saab Auditorium – Room 1)**: Blockchain Enabled Novel Applications Prof. Wenjing Lou, Virginia Polytechnic Institute and State University, USA Chaired by Prof. Raimo Kantola
14:15-15:00	Invited Talk 2 **(TU1 Saab Auditorium – Room 1)**: IoT for Connected Health Prof. Honggang Wang, University of Massachusetts Dartmouth, USA Chaired by Prof. Roberto Di Pietro
15:00-15:30	**Break**
15:30-16:15	Invited Talk 3 **(TU1 Saab Auditorium – Room 1)**: Towards Real-Time Machine Learning for Digital Trials and Precision Health: Intelligent Behavioral Trajectory Pattern Recognition Prof. Hua Fang, University of Massachusetts Dartmouth, USA Chaired by Prof. Valtteri Niemi
16:15-17:00	Invited Talk 4 **(TU1 Saab Auditorium – Room 1)**: Advancing Agenda of Green and Granular Machine Learning: Developments in Knowledge Transfer, and Knowledge Distillation Prof. Witold Pedrycz, University of Alberta, Canada Chaired by Prof. Zheng Yan
17:00-17:30	**Closing Session (TU1 Saab Auditorium – Room 1)**

SmartData-1: Smart/Big Data Processing and Analytics I
Session Chair: Jordi Mongay Batalla, Warsaw University of Technology & National Institute of Telecommunications, Poland

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
Session Chair: Jing Yang, Hainan University, China

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
Session Chair: Jenny Liu, Spruce Creek High School, USA

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, Lijiao Chen, Xiaojing Shen, Qi Wu, Wendou Wu and Baijuan Wang (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
Session Chair: Jinke Wang, Henan University, China

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
Session Chair: Adamu Hussaini, Towson University, USA

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 (University of Kaiserslautern & DFKI GmbH, Germany); Yuki Matsuda (Nara Institute of Science and Technology, Japan); Yutaka Arakawa (Kyushu University, Japan); Shoya Ishimaru (University of Kaiserslautern & DFKI GmbH, Germany)

SmartData-6: Data Science and Its Foundations
Session Chair: Zhenyan Ji, Beijing Jiaotong University, China

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)
Session Chair: Qin Yan, Nanyang Technological University, Singapore

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)
Session Chair: Qinwei He, Global Energy Interconnection Research Institute (GEIRI) Europe, Germany

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

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13:00-14:00	
14:00-15:00	
15:00-15:15	**Break**
15:15-16:15	GreenCom-1 Smart Energy and Smart Grids
16:15-17:15	GreenCom-2 AI and Green Society Application

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10:30-11:00	**Break**
Room	**AS4 (Room 3)**
11:00-12:00	GreenCom-3 Green Computing and Communication
12:00-13:00	**Lunch Break (TUAS Building Pantry)**
13:00-14:00	GreenCom-4 Invited Talks
14:00-15:00	
15:00-15:30	**Break**
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16:30-17:30	
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17:00-17:30	**Closing Session (TU1 Saab Auditorium – Room 1)**

GreenCom-1: Smart Energy and Smart Grids
Session Chair: Xiaowen Chu, The Hong Kong University of Science and Technology (Guangzhou), China

1. #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)

2. #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)

3. #1570810684: Influence of Communication Technologies in Smart Grid Power Congestion Management

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

GreenCom-2: AI and Green Society Applications
Session Chair: Xiaowen Chu, The Hong Kong University of Science and Technology (Guangzhou), China

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
Session Chair: Edith Ngai, The University of Hong Kong, China

1. #1570800117: Adaptive Sampling for Efficient Acoustic Noise Monitoring: an Incremental Learning Approach
Faiga Alawad (Norwegian University of Science and Technology, Norway)

2. #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)

3. #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)

4. #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
Session Chair: Edith Ngai, The University of Hong Kong, China

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

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- Bocheng Ren, *Huazhong University of Science and Technology, China*
- Shushu Liu, *Aalto University, Finland*

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- Suning Chen, *Huazhong University of Science and Technology, China*

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- Lejla Begic Fazlic, *Trier University of Applied Sciences, Germany*
- Yaliang Zhao, *Henan University, China*

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- Linglin Xia, *Nanchang University, China*

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- Zhikui Chen, *Dalian University of Technology, China*
- Carson K. Leung, *University of Manitoba, Canada*

Publicity Chairs

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- Jian Wang, *University of Tennessee, USA*
- Leilei Yan, *Soochow University, China*

Web Chair

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- Jussi Kangasharju, *University of Helsinki, Finland*
- Xue (Steve) Liu, *McGill University, Canada*

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- Dapeng Wu, *Chongqing University of Posts and Telecommunications, China*
- Di Wu, *Samsung AI Center Montreal, Canada*

Publicity Chairs

- Sabita Maharjan, *University of Oslo, Norway*
- Puning Zhang, *Chongqing University of Posts and Telecommunications, China*
- Susu Xu, *Stony Brook University, USA*

Web Chair

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

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- Laurence T. Yang (Chair), *St Francis Xavier University, Canada*
- Jinsong Wu, *University de Chile, Chile*
- Jianhua Ma, *Hosei University, Japan*
- Jinjun Chen, *Swinburne University of Technology, Australia*
- Honggang Zhang, *Zhejiang University, China*