

IEEE ISPCE-AS 2023, 3-5 November 2023, Shanghai, China



**IEEE ISPCE-AS 2023**

# **Programme**

**IEEE International Symposium  
on Product Compliance Engineering-Asia 2023**

3-5 November 2023

Shanghai, China

<https://dl2link.com/ISPCE-AS2023/>

**Co-Organised by** Donghua University, Shanghai, China  
IEEE Product Safety Engineering Society

**Sponsored by** IEEE Product Safety Engineering Society  
IEEE Consumer Technology Society



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A wide-angle photograph of the Shanghai skyline, featuring prominent skyscrapers like the Oriental Pearl Tower and the Shanghai Tower, set against a clear blue sky with light clouds. The buildings are reflected in the water in the foreground.

# 01 Messages from IEEE ISPCE-AS 2023 Chairs

*Dear Guests and Colleagues of the ISPCE-AS 2023,*

*ISPCE-AS 2023 will fully dedicate to the theme “Product Safety for Smart City”. Topics of ISPCE-AS 2023 cover (1) Emerging IoT technologies such as 5G, NB IoT, LoRa, Sigfox, RFID, NFC etc for safety applications e.g. landslides, IoT water, ...(2) Drones for building applications, healthcare, automobiles, road toll (3) artificial intelligence, robotics, stems, V2X, etc. (4) Mobile communication, transportation, energy efficiency (5) Public safety, critical communication (6) Internet of Things, Spectrum Policy (7) Inherently safer products and equipment (8) Product Safety services (9) Training and continuing education (10) Regulations and standards (11) Risk management (12) Workplace product safety (13) System and Software safety (14) Human factors, product compliance, smart sensors compliance. There will be Regular Sessions, Special Sessions, Tutorials and Visits. I am sure professionals and engineers may exchange ideas and learn from one another.*

*Please make yourself available for these three days of conference for informative scientific and technological presentations and discussions with professionals and colleagues.*

*The Organizing Committee (OC) does not only provide you the chance to enjoy an informative and stimulating atmosphere but also set up a first-class conference program. I want to make you aware that the City of Guangzhou is wonderful and professional environments for smart city development and thus are excellent venues for professional exchange. The OC is thoughtful to include the authentic food, welcome reception and conference dinner into the registration fee.*

*I am confident that we will have an excellent time during these three days at ISPCE-AS 2023 and that at the end of the conference we will learn new knowledge and ideas. Please join us at ISPCE-AS 2023!.*

*Yours sincerely,*

*Prof. Kim-Fung Tsang, Prof. Haijun Zhang and Prof. Mingbo Zhao*

*General Co-Chairs of ISPCE-AS 2023*

# 02 Organization of IEEE ISPCE-AS 2023

## IEEE ISPCE-AS 2023 General Chairs:

Kim-Fung Tsang, H.K.

## IEEE ISPCE-AS 2023 General Co-Chairs:

Haijun Zhang, P.R.C

Mingbo Zhao, P.R.C

## IEEE ISPCE-AS 2023 Technical Program Chairs:

Kai Liu, P.R.C

Bingo Wing-Kuen Ling, P.R.C.

## IEEE ISPCE-AS 2023 Finance Chairs:

Y.H. Shum, H.K.

Jason Chan, H.K.

Chengqing Li, P.R.C.

Tianyong Hao, P.R.C.

Zhou Wu, P.R.C.

## IEEE ISPCE-AS 2023 PSES President:

Mike Nicholls, US

## IEEE ISPCE-AS 2023 PSES Past President:

Stefan Mozar, AU





# 02 Organization of IEEE ISPCE-AS 2023

## **PSES VP Conference:**

Bansi Patel, US

## **Publication Chairs:**

Jingjing Cao, P.R.C

Hao Zhang, P.R.C

Qaing Jia, P.R.C

SL Mak, HK

## **International Coordinators:**

Flore Chiang , TW

Nancy Leveson, US

Claire Tsai, TW

Weizhi Meng, DEN

Cuili Yang, P.R.C

## **Conference Secretaries:**

Jimmy CH Li , HK

Dawei Li, P.R.C

## **Liaison:**

WC Lee, HK

Alick Mak, HK

Eddie Liu, HK

## **Logistics:**

George Chan

## **Webmasters:**

Fanny WF Tang, HK

Xinrui Yu, P.R.C

Chunxin Zhang, P.R.C

# 02 Organization of IEEE ISPCE-AS 2023

## Track Co-Chairs:

Track 1: Data and Knowledge based AI with application to security, stability and optimization of industrial process

Qiang Jia (Jiangsu University)

Cuili Yang (Beijing University of Technology)

Xiaowen Bi (City University of Hong Kong)

Track 2: AI-driven Cybersecurity Engineering and its Applications

Weizhi Meng, Technical University of Denmark, Denmark

Yu Wang, Guangzhou University, China

Chengqing Li, Xiangtan University, China

Track 3: Intelligent Data Processing for Consumer Electronics

Zhigao Zheng, Wuhan University

Shahid Mumtaz, Nottingham Trent University

Cheng Dai, Sichuan University

Track 4: Advances in AI-driven Complex Systems and its Consumer and Industrial Applications

Jingjing Cao, Wuhan University of Technology, China

Xin Su, Hohai University, China

Choujun Zhan, South China Normal University, China

Track 5: Edge Intelligence and Its Applications to Consumer Electronics

Penglin Dai, Southwest Jiaotong University

Hao Zhang, Chongqing University of Posts and Telecommunications

Track 6: Artificial Intelligence in Abnormal Detection, Fault Diagnosis and Prognostic Management

Huiming Jiang, University of Shanghai for Science and Technology

Jing Yuan, University of Shanghai for Science and Technology

Yu Wang, Xi'an Jiaotong University

# 03 Programme Overview

## Tentative Rundown on 4 November 2023 (Saturday)

Time	Event	Duration
9:00-9:20	Opening and Welcome Speech	20mins
9:20-9:30	Conference Introduction	10mins
9:30-9:40	Group Photo	10mins
9:40-10:25	Keynote speech 1: Clean Energy to Mitigate Carbon Emission – By Mr. Philip M. Piqueira, the U.S. National Committee, America	45mins
10:25-10:30	Q&A of Keynote speech 1	5mins
10:30-10:50	Coffee Break	20mins
10:50-11:35	Keynote speech 2: Key Technologies for Integrated Communication and Sensing – By Prof. Shunqing ZHANG, Shanghai University	45mins
11:35-11:40	Q&A of Keynote speech 2	5mins
12:00-13:30	<b>Lunch Break</b>	
13:30-16:00	Session 1: PPT Report	15mins per author
13:30-16:00	Session 2: PPT Report	15mins per author
16:00-17:50	Standards Forum	110mins
18:30-20:30	Dinner Time and Reward Session	
	<b>END</b>	

# 03 Programme Overview

## Tentative Rundown on 5 November 2023 (Sunday)

Time	Event	Duration
9:00-9:45	Keynote speech 1: Towards Universal Automation: The Future Generation of Industrial Automation Systems – By Prof. Wenbin DAI, Shanghai Jiaotong University, China	45mins
9:45-9:50	Q&A of Keynote speech 1	5mins
9:50-10:35	Keynote speech 2: Augmented Language Models: Key Technologies and its Applications – By Prof. Haofen WANG, Tongji University, China	45mins
10:35-10:40	Q&A of Keynote speech 2	5mins
10:40-10:55	Coffee Break	15mins
10:55-11:40	Keynote speech 3: Recent advances in AI based large-scale biomedical semantic indexing – By Prof. Shanfeng ZHU, Fudan University, China	45mins
11:40-11:45	Q&A of Keynote speech 3	5mins
11:45-13:30	<b>Lunch Break</b>	
13:30-16:30	Session 1: PPT Report	15mins per author
13:30-16:30	Session 2: PPT Report	15mins per author
17:00-17:30	<b>Closing Ceremony</b>	30mins
<b>END</b>		



# 04 Programme in Detail



## Opening

**Date & Time:** November 4th (Saturday), 9:00-11:40

**Venue:** L3 Shanghai Hall, Shanghai Fuyue Hotel, Line.208 Rongyue Road, Songjiang District, Shanghai, 201613

**Host:** Prof. Haijun Zhang

1. **Opening Speech from Dean of College of Information Science and Technology, Donghua University**
2. **Opening Speech from General Chair of IEEE ISPCE-AS 2023:**  
*Kim-Fung Tsang, City University of Hong Kong*
3. **Welcome Speech from IEEE PSES**
4. **Conference Introduction from Technical Program Chair**



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## Keynote Speech

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**Host:** Prof. Mingbo Zhao

5. **Keynote speech: UL Standards Approach to Mitigate Carbon Emission**  
By Mr. Philip M. Piqueira, the U.S. National Committee, America  
Time: 9:40-10:30
6. **Keynote speech: Key Technologies for Integrated Communication and Sensing**  
Prof. Shunqing ZHANG, Shanghai University, Shanghai, China  
Time: 10:50-11:40



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# Session 1

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**Date & Time:** November 4th (Saturday), 13:30-16:00

**Venue:** L3 Shanghai Hall, Shanghai Fuyue Hotel, Line.208 Rongyue Road, Songjiang District, Shanghai, 201613

Chair: Dr. Choujun Zhan, Dr. Ye Wang and Prof. Shuqiang Wang

1. **(13:30-13:45) Intelligent Retrieval and Question Answering Technology for Power Grid Security Standards: A Brief Survey**  
Feng Gao, Yazi Li, Weiwei Sun and Haijun Zhang
2. **(13:45-14:00) A Privacy-aware Framework for Assessing and Recommending Short Video Advertisement**  
Xinqiang Jiang, Yingnan Geng, Yinzhou Xiong, Fei Tao and Ye Wang
3. **(14:00-14:15) Generative AI Enables EEG Data Augmentation Via Diffusion Model**  
Tong Zhou, Xuhang Chen, Yanyan Shen and Shuqiang Wang
4. **(14:15-14:30) SETRN: A Transform Structure with Adaptive 3D Attention Mechanism and Global Semantic Supervision for Mobile-Captured Retail Receipts Recognition**  
Lujiao Shao, Haijun Zhang, Chunxin Zhang and Han Yan
5. **(14:30-14:45) A CNN-LSTM-Based Model for Predicting Monthly Power Capacity**  
Guoyao Wu, Zhiqiang Lan, Xiaofang Wu, Linling Mao, Sijie Chen, Yali Huang and Zhenwei Huang
6. **(14:45-15:00) An efficient algorithm to remove electrocardiogram from respiratory signals by using wavelet spectrum and secant method**  
Guo Luo, Yingjie He, Hu Min, Zhi Yang and Zenglin Cai
7. **(15:00-15:15) Query Reformulator And Contrastive Answer Ranker For Conversational Question Answering Over Knowledge Graph**  
Zhipeng Liu, Heng Weng, Jun Yan, Hai Liu and Tianyong Hao
8. **(15:15-15:30) Sequence Residual Frequency Domain Segmentation Temporal Convolutional Network for COVID-19 Prediction**  
Xuejiao Zhao, Zhengyang Hou, Peijun Wang and Choujun Zhan
9. **(15:30-15:45) Feature-Ranked Attention-Driven LSTM: A Novel Hybrid Model for Short-Term Stock Price Predictions**  
Yufan Chen, Fujian Wu, Guanzhi Li and Choujun Zhan

**10. (15:45-16:00) Improved Neural Collaborative Filtering  
Recommendation Method based on Multi-Head Attention and  
Feature Fusion**

Yan Tang, Xin Zhang and Xiu Zhang

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## Session 2

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**Date & Time:** November 4th (Saturday), 13:30-16:00

**Venue:** L3 No. 1 Hall, Shanghai Fuyue Hotel, Line.208 Rongyue Road, Songjiang District, Shanghai, 201613

**Chair:** Prof. Bingo Wing-Kuen Ling, Dr. Xin Zhang and Dr. Weitao Li

1. **(13:30-13:45) A Joint Design of Path Planning and Lane Reservation for Emergency Service in ITS**  
Zhaoyang Li, Bingyi Liu, Enshu Wang, Jinfan Wang and Weizhen Han
2. **(13:45-14:00) Synthesis of Biocomposite through Electrospinning and Screw Extruder in Smart Laboratory Safety**  
Christie Ng, Wing Tung Ho and Chi Ho Li
3. **(14:00-14:15) An Approximation Technique for Solving Linear-Quadratic Optimal Control Problems Using Chebyshev Polynomials**  
Di Wu, Yuanyuan Xue, Yanqin Bai, Changjun Yu, Bingo Wing-Kuen Ling and Zhonghua Miao
4. **(14:15-14:30) Advancing Fire Safety in Hong Kong Buildings: An IoT-Based Fire Accident Indication System**  
Chi Chung Lee, Siu Kei Lam, Wang Kei Kwong, Wun Ka Lau, Check Nam Tung, Yuk Ming Cho and Chun Yin Li
5. **(14:30-14:45) Research on Reducing the Resonance Frequency of Low Frequency Metamaterials**  
Yajuan Lu, Xiu Zhang and Xin Zhang
6. **(14:45-15:00) Quality-Cost Trade-off on Constructing Logical Views for Vehicular Cyber-Physical Systems: A Deep Reinforcement Learning Approach**  
Junyuan Wu, Xincao Xu, Chuzhao Li, Hao Zhang, Ke Xiao and Kai Liu
7. **(15:00-15:15) Double-quantitative Rough Sets in Interval-Valued Intuitionistic Fuzzy Ordered Systems**  
Sihao Wu, Wentao Li, Chao Zhang and Tao Zhan
8. **(15:15-15:30) Consumer and Industrial Mobile Robot Navigation Based on Evidential Multi-Granularity Three-Way**  
Juanjuan Ding, Chao Zhang, Deyu Li and Wentao Li



9. (15:30-15:45) **A Critical Review on Hazard Analysis and Risk Assessment for Development of Wearable Medical Devices**  
W.Y Chak, Shu Lun Mak, S.K. Lam, Fanny Tang, Chi Chung Lee and Chi Ho Li
10. (15:45-16:00) **ComESN: Compressive Echo State Network for Multi-task Time-series Prediction**  
Ruiqi Jiang and Zhou Wu

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## Standards Forum

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**Date & Time:** November 4th (Saturday), 16:00-17:50

**Venue:** L3 Shanghai Hall, Shanghai Fuyue Hotel, Line.208 Rongyue Road, Songjiang District, Shanghai, 201613

**Chair:** Prof. Haijun Zhang

This is the second activity of CTSoc Standards Committee – “Standards Forum 2023 –Fall”, organized by CTSoc Society Committee of Standards (SCS) and co-sponsored by IEEE CTSoc Technical & Educational Activities. Members will share their experience and insights in the professional development. A forum discussion will then follow. Members will give reports on their recent development and the roadmap. Audience will learn about the visions and skills and share their expert opinions in the standards development.

Time	Event	Duration
16:00-16:05	Welcome Message -By Raed Abdullah, IEEE CTSoc, VP ISA	5mins
16:05-16:10	Opening Speech -By KF Tsang, Chairman, Standards Committee, IEEE Consumer Technology Society (IEEE CTSoc)	5mins
16:10-16:25	Speech 1: Web3: The Emerging Next-Generation Internet Framework -By Dr. Zihang Yi, China Academy of Information and Communications Technology (CAICT), PRC	15mins
16:25-16:40	Speech 2: Service-Orientated Fashion Intelligence -By Prof. Haijun Zhang, Harbin Institute of Technology, Shenzhen, PRC	15mins
16:40-16:55	Speech 3: Edge Intelligence for Internet of Vehicles (IoVs) -By Prof. Kai Liu, Chongqing University, Chongqing, PRC	15mins
16:55-17:10	Speech 4: UL Standards Solution to Cybersecurity of Medical Devices -By Jessie Guo, Regional Standards Manager, UL Standards & Engagement, PRC	15mins
17:10-17:15	Photo taking	5mins
17:15-17:45	Forum discussion: Innovations in standards development Panel members: Dr Cheng Chi, Prof Aaron Zhang, Prof. Kai Liu, Jessie Guo	30mins
17:45-17:50	<b>Closing Speech</b> -By Prof. Haijun Zhang, Harbin Institute of Technology, Shenzhen, PRC	5mins
<b>END</b>		

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# Keynote Speech

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**Date & Time:** November 5th (Sunday), 9:00-12:00

**Venue:** L3 Shanghai Hall, Shanghai Fuyue Hotel, Line.208 Rongyue Road, Songjiang District, Shanghai, 201613

**Host:** Prof. Zhou Wu

- 1. Keynote speech: Towards Universal Automation: The Future Generation of Industrial Automation Systems**  
Prof. Wenbin DAI, Shanghai Jiaotong University, China  
Time: 9:00-9:50
- 2. Keynote speech: Augmented Language Models: Key Technologies and its Applications**  
Prof. Haofen WANG, Tongji University, China  
Time: 9:50-10:40
- 3. Keynote speech: Recent advances in AI based large-scale biomedical semantic indexing**  
Prof. Shanfeng ZHU, Fudan University, China  
Time: 10:55-11:45

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# Session 1

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**Date & Time:** November 5th (Sunday), 13:30-16:30

**Venue:** L3 Shanghai Hall, Shanghai Fuyue Hotel, Line.208 Rongyue Road, Songjiang District, Shanghai, 201613

**Chair:** Dr. Cuili Yang, Dr. Ke Xiao and Dr. Jingjing Cao

1. **(13:30-13:45) Two-Space Prediction Approach Based Evolutionary Dynamic Multiobjective Optimization**  
Jiamin Yu, Cuili Yang and Hongyu Wang
2. **(13:45-14:00) Data-driven LESN-DHP controller design and application**  
Hongyu Wang, Cuili Yang and Jiamin Yu
3. **(14:00-14:15) An Extended Inverse Reinforcement Learning Control For Target-Expert Systems With Different Parameters**  
Jin Lin, Yunjian Peng, Lei Zhang and Jinze Li
4. **(14:15-14:30) UAV Trajectory Planning for Data Collection in Internet of Vehicles: A Reinforcement Learning Approach**  
Zhong Chengliang, Jiang Luyao, Yan Guozhi, Ren Hualin, Xiao Ke and Liu Kai
5. **(14:30-14:45) Enhancing Navigation Aids Status Recognition Based on Extended Space Forest and Time Domain Features Fusion**  
Zhipeng Wen, Jingjing Cao, Liang Huang, Dengfeng Li, Longwu Sun and Xiaodie Huang
6. **(14:45-15:00) Event-Based Pinning Synchronization of Stochastic Networks With Delayed Nodal Dynamics**  
Zirong Liu and Qiang Jia
7. **(15:00-15:15) Rotated quaternion valued algebra and its application to discrete time rotated quaternion valued Fourier transform based human signal processing**  
Yiting Wei, Lingyue Hu, Bingo Wing-Kuen Ling and Yongwei Huang
8. **(15:15-15:30) Integrating Functional Safety into Hazard-Based Safety Engineering: Towards a Comprehensive Framework**  
Shun Zhang and Haiwen Lu



9. (15:30-15:45) **Electrical Equipment Fault Diagnosis: A Technique Combining Fuzzy Logic and Large Language Models**

Xu Tao

10. (15:45-16:00) **Comprehensive Browser Extension for Analysing YouTube User Engagement, Controversy, User Requirements, and Trending Keywords**

Praveen Peiris, Thursha Herath, Roshani Dissanayaka,  
Kanishka Saranga, Samantha Thelijjagoda and Ishara  
Weerathunge

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## Session 2

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**Date & Time:** November 5th (Sunday), 13:30-16:30

**Venue:** L3 Shanghai Hall, Shanghai Fuyue Hotel, Line.208 Rongyue Road, Songjiang District, Shanghai, 201613

**Chair:** Dr. Yongfeng Zhang and Dr. Xiaowen Bi

1. **(13:30-13:45) Predicting the Energy Meter Demand by a Window-based Gradient Boosting Regression Tree Model**  
Lijuan Zhang, Jiao Wang, Qingjuan Zeng, Houyuan Zhou, Minxian Hu, Yuanyuan Guo and Qiuwen Wang
2. **(13:45-14:00) Periodic Analysis of Meter Installation data in Fujian Province based on Spectral Analysis**  
Jiao Wang, Houyuan Zhou, Lijuan Zhang, Qiaowen Hong, Sucun Lin and Hanzhi Yang
3. **(14:00-14:15) Analysis of the cyclical change in the capacity of business expansion based on spectral analysis**  
Guoshu Lai, Guoyao Wu, Kun Zhou, Zhiqiang Lan, Xiaoying Huang, Linling Mao, Jiaqi Li, Fangzhou Zou and Haicheng Huang
4. **(14:15-14:30) Evaluation and Analysis Method for Distribution Network Flexibility Considering Typical Scene Set**  
Xiuru Wang, Taibao Xia, Yong Li and Jian Sun
5. **(14:30-14:45) Design and implementation of a lightweight advertising system based on Internet of Things**  
Xiaolong Xu, Zhengjun Jing, Xingyu Liu, Guandi Shao and Qiuru Cai
6. **(14:45-15:00) Height estimation and the number of trees in transmission line corridors based on multi-source data fusion**  
Xindong Tian and Yongfeng Zhang
7. **(15:00-15:15) Research and Implementation of Visual Recognition Technology for Production Status of Catalyst Workshop Conveyor Belt**  
Junyu Zhou and Yongfeng Zhang
8. **(15:15-15:30) The impact of regenerative braking in electric vehicles to energy-efficient routing performance**  
Xiaowen Bi, Jing Wang, Chi-Tsun Cheng and Edward Chung

9. (15:30-15:45) **Intelligent Sharding Decision for Blockchain-Enabled Industrial IoT Based on A3C Approach**

Xin Xiong, Meng Li, Pengbo Si, Ruizhe Yang, Cuili Yang  
and Zhuwei Wang

10. (16:00-16:15) **Temporal Action Localization : A Review**

Wang Peng and Shoupeng Lu



## **Closing Ceremony**

**Time: November 5th (Sunday), 17:00-17:30**

**Venue:** L3 Shanghai Hall, Shanghai Fuyue Hotel, Line.208 Rongyue Road,  
Songjiang District, Shanghai, 201613

**Summary Speech from Prof. Mingbo Zhao, General Co-Chair of IEEE ISPCE-AS  
2023**



# IEEE ISPCE-AS 2023

IEEE International Symposium on Product Compliance Engineering-Asia 2023

## Thank You!



Thank you for attending the IEEE ISPCE-AS 2023!

