

# 15th International Conference on Information Science and Technology (ICIST 2025)

December 5 - 8, 2025  
Zhanjiang, Guangdong, China

## Final Program



### Sponsors/organizers:



Guangdong Ocean  
University



Guangdong University of  
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### Technical co-sponsors:



IEEE Systems, Man and  
Cybernetics Society

## **Welcome Messages**

On behalf of the Organizing Committee, we cordially welcome you to join us at the 15th International Conference on Information Science and Technology (ICIST 2025), to be held in Zhanjiang, Guangdong, from December 5 to 8, 2025. Through this conference, we aim to foster the sharing and exchange of individual experiences and expertise in information science and technology, encompassing both theoretical and practical insights. The conference features plenary speeches delivered by world-renowned scholars, as well as regular sessions with broad coverage and special topics.

ICIST 2025 attracted over 50 submissions, addressing the state-of-the-art development and research in topics related to computer networks, artificial intelligence, autonomous systems, linear and nonlinear control, robust control, learning and adaptive control, signal processing, and more. Based on rigorous peer reviews by the Program Committee members and reviewers, 38 papers (with an Acceptance rate of 71.7%) were selected to be presented at the conference and included in the conference proceedings.

The conference program is highlighted with a plenary talk and an invited talk. We would like to express our sincere appreciation and acknowledgement to the distinguished plenary and invited speakers: Professor Sam Tak Wu Kwong (IEEE Fellow) from Lingnan University and Professor Ye Li (IET Fellow) from the Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences. The talks focus on multi-robot coordination and intelligent diagnosis.

Several organizations and numerous volunteers made significant contributions to the success of this conference. We would like to express our sincere gratitude to Guangdong Ocean University for their sponsorship, City University of Hong Kong and Guangdong University of Petrochemical Technology for their co-sponsorship, and the IEEE Systems, Man, and Cybernetics Society for its technical co-sponsorship. Special thanks are extended to the Program Committee Chairs and members for their thorough reviews of all submissions, and to the organizing committee and volunteers for their warm and thoughtful service to all participants. We would also like to express our high appreciation and gratitude to all of the authors and participants. Without the contributions of the authors, the conference would not have been possible.

We wish you to enjoy the conference and stay in Zhanjiang both academically and socially!

Dongyang Fu and Jun Wang, General Chairs

Ji Wang and Yuqiang Yang, Organizing Chairs

Long Jin, Zhihui Zhan, and Jiliang Zhang, Program Chairs

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Xiuchun Xiao, Guangdong Ocean University, Zhanjiang, China

## Program at a Glance

December 5, 2025	
13:00-18:00	Registration (Lobby, Yunhai Building, Zhanjiang Hai Bin Hotel)
18:00-19:30	Welcome Dinner (Huayuan Hall, first Floor, Zuihai Building)
December 6, 2025	
	Plenary Session (Blue Moon Hall, second Floor, Panhai Building)
9:20-9:30	Opening Ceremony
9:30-10:30	Keynote Speech: Professor Sam Tak Wu Kwong
10:30-11:00	Coffee Break
11:00-12:00	Invited Speech: Professor Ye Li
12:00-13:00	Lunch Break (Huayuan Hall, first Floor, Zuihai Building)
	Sessions (Blue Moon Hall)
13:00-15:00	Sa: Intelligent Control and Automation
15:00-15:20	Coffee Break
15:20-17:20	Sb: Intelligent Information Processing
18:00-19:30	Banquet (Huayuan Hall, first Floor, Zuihai Building)
December 7, 2025	
	Online Sessions (Zoom Meeting: 882 8068 0581)
8:00-10:00	Sa1: Intelligent Computing and Optimization Theory
10:00-12:00	Sa2: Robots and Control Systems
12:00-13:00	Lunch Break
13:00-15:00	Sb1: Machine Learning
15:00-17:20	Sb2: Data Processing

## Keynote Speech

### Empowering Multi-Robot Flocking in Complex Environments via Effective Communication: A Deep Reinforcement Learning Approach

Professor Sam Tak Wu Kwong,

Lingnan University, Hong Kong

**Abstract:** Multi-robot flocking is crucial for safe and cooperative navigation, with wide applications in logistics, service delivery, and mobile surveillance. Despite significant progress, developing effective flocking strategies under complex conditions remains challenging. Communication is a vital technique for multi-robot coordination. In this paper, we propose REIN, a novel deep reinforcement learning-based framework designed to improve communication effectiveness in leader-follower flocking systems through the Refinement and Enhancement of communication INformation. Firstly, regarding information refinement, a graph-based information refiner, integrating directed graph-structured communication with an innovative edge filter, is developed for selective multi-robot interaction. It helps robots adaptively focus on relevant neighbors, considerably alleviating information overload. Secondly, for information enhancement, a cognition-aligned information enhancer is designed that boosts information expressiveness by encouraging team consensus. It utilizes two cascaded leader-related objectives to optimize information towards cognitive alignment among decentralized followers. Extensive comparisons with state-of-the-art approaches and ablation versions demonstrate the superiority of our framework. Physical experiments are also conducted to validate its practicality.



**Biosketch:** Sam Tak Wu Kwong is the Associate Vice-President (Strategic Research), J.K. Lee Chair Professor of Computational Intelligence, the Dean of the School of Graduate Studies, and the Acting Dean of the School of Data Science of Lingnan University. Professor Kwong is a distinguished scholar in evolutionary computation, artificial intelligence (AI) solutions, and image/video processing, with a strong record of scientific innovations and real-world impacts. Professor Kwong is one of the most highly cited researchers by Clarivate in 2022, 2023 and 2024. He has also been actively engaged in knowledge transfer between academia and industry. He was elevated to IEEE Fellow in 2014 for his contributions

to optimization techniques in cybernetics and video coding. He was the President of the IEEE Systems, Man, and Cybernetics Society (SMCS) in 2021-22. He is a fellow of the US National Academy of Inventors (NAI), the Canadian Academy of Engineering, and the Hong Kong Academy of Engineering (HKAE). Professor Kwong has a prolific publication record with over 350 journal articles and 160 conference papers with an h-index of 96 based on Google Scholar. He is currently the associate editor of several leading IEEE transaction journals.



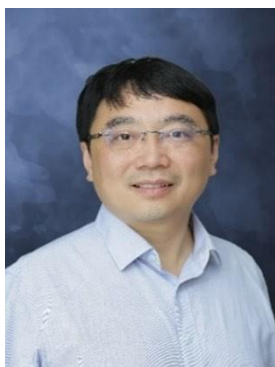
## Invited Speech

### Title: AI-Driven Digital Healthcare Technology and System

Professor Ye Li

Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences

**Abstract:** The short-term prediction and prevention of acute cardiovascular and cerebrovascular events remain a formidable clinical challenge. Two key barriers persist: (1) the difficulty of obtaining continuous, real-time (24/7) health data, and (2) the limited accuracy of multi-dimensional big data analytics. To tackle these interdisciplinary challenges—encompassing ubiquitous sensing, intelligent diagnosis, and precise prediction across the entire lifecycle of cardiovascular and cerebrovascular health—this study leverages medical-knowledge-driven artificial intelligence (AI) to systematically investigate novel theories for non-invasive and unobtrusive detection of multiple physiological signals. Our work aims to accelerate the translation of intelligent wearable technologies for continuous health monitoring and the development of corresponding devices. Furthermore, we propose an innovative framework that synergistically integrates multi-dimensional health state representations: real-world electronic medical records (EMRs), wearable-derived data, and imaging-based structural information. This integrated approach significantly improves disease model accuracy and facilitates the clinical implementation of smart healthcare solutions.



**Biosketch:** Ye Li is the Chair Professor at the Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, Director of the Institute of Advanced Computing and Digital Engineering, and Deputy Director of the CAS Key Laboratory of Health Informatics. He is a Fellow of the Institution of Engineering and Technology (IET) and the Royal Society for Public Health (RSPH) in the UK. His main research areas include wearable healthcare systems, medical artificial intelligence (AI), and large health models. He has undertaken projects related to precision health from the National Key R&D Program, CAS Pilot Project, National Natural Science Foundation of China, etc. He has published more than 170 papers and was selected as one of the top 2% scientists globally by Stanford University. He serves as an editorial board member or executive editor for renowned international journals such as *Information Fusion* and *Physiological Measurement* in the fields of AI and biomedical engineering. He has been granted 82 domestic and international invention patents, 16 of which have been commercialized. He has transferred and developed 3 CFDA registered wearable healthcare devices covering more than 500,000 people annually. He has led 3 national and ITU standards related to e-health and partially contributed to the guidance of health information systems by WHO. Professor Li Ye has won the Guangdong Provincial Science and Technology Invention Award, Patent Award, and the Chinese Medical Association Health Management Award, etc.

**December 6, 2025**

**9:20 - 9:30    Opening Ceremony**

9:30 - 10:30 Keynote Speech: Prof. Sam Tak Wu Kwong - Empowering Multi-Robot Flocking in Complex Environments via Effective Communication: A Deep Reinforcement Learning Approach

10:30 - 11:00    Coffee Break

11:00 - 12:00 Invited Speech: Prof. Ye Li - AI-Driven Digital Healthcare Technology and System

**12:00-13:00    Lunch Break**

**Sa: Intelligent Control and Automation**

**Chairs: Xiuchun Xiao and Dongsheng Guo**

**Room: Blue Moon Hall**

13:00 - 13:20    *Application of Velocity Pausing Particle Swarm Optimization to Unmanned Surface Vessel Path Planning*

Mingkun Pan and Yi Zuo

13:20 - 13:40    *High-Precision UAV Detection via Enhanced Feature-Aware Models*

Yang Yu, Wenli Wu, Xiaodan Huang, Bohuan Xue and Xiangguang Dai

13:40 - 14:00    *Two-Stage Robust Optimization Scheduling for Integrated Energy Systems in Coal Mines*

Shicheng Wang, Caizheng Ma, Cong Wang and Hongli Zhang

14:00 - 14:20    *Mechanism of Driver Emotion Impact on Driving Risk*

Lang Wang, Qiu Hu, Chen Yang, Yifan Lu, Shuangle Wu, Jiayi Zhang and Yifan Lu

14:20 - 14:40    *A Calibration and Measurement Method for Rotational Viscometers Based on Kalman Filtering*

Qiyu Chen and Shenshen Gu

14:40 - 15:00    *A Comprehensive Embedded System for Rotational Viscosity Measurement and Visualization*

Chenyang Han and Shenshen Gu

**15:00-15:20 Coffee Break**

**Sb: Intelligent Information Processing**

**Chairs: Yinyan Zhang and Jianchao Fan**

**Room: Blue Moon Hall**

- 15:20 - 15:40     *A Fusion Model of SVM and CNN for Muscle Fatigue State Classification by EIT*  
Dan Yang, Fa Yang, Li Zhu, Jiliang Zhang and Bin Xu
- 15:40 - 16:00     *Nesterov Accelerated Gradient Neural Networks*  
Chengze Jiang, Aiping Ye, Huiting He and Zhiyuan Song
- 16:00 - 16:20     *Machine Learning for Remote Sensing Inversion of Nutrients: A Case Study in Zhejiang Province*  
Zhuoqi Zheng, Difeng Wang, Fang Gong, Qiankun Zhu, Jingjing Huang and Qing Zhang
- 16:20 - 16:40     *Tunnel Crack Detection by Vision Foundation Model Queries*  
Jida Yang, Bing Han, Zheng Yang and Zhihui Zhan
- 16:40 - 17:00     *A Diagonal Scaling-Based Discrete-Time Gradient Neural Network for Time-Varying Constrained Nonlinear Optimization*  
Juliang Wang, Haoen Huang, Zhigang Zeng
- 17:00 - 17:20     *Evolutionary Multitasking with Second-order Knowledge Information for Community Detection*  
Wenming Yue, Hong Zhao and Xuhui Ning



December 7, 2025

**Online Sessions**

**Zoom Meeting ID: 882 8068 0581**

**Zoom Meeting Link:**

<https://cityu.zoom.us/j/88280680581?pwd=hyMRme7OHbGPB8bUbgtNoayeyEKUyP.1>

**Sa1: Intelligent Computing and Optimization**

**Chairs: Lin Xiao and Zhengtai Xie**

- 8:00 - 8:20     *Blue Nose-based Generative Models for the Imputation of Time-series Data*  
Tong Si, Graham Bishop and Haijun Gong
- 8:20 - 8:40     *Enhancing Fatality Rate Prediction: A Hybrid PSO-LS-SVM Approach with Socio-Demographic Feature Integration*  
Abdoulaye Barry, John Irungu, Nian Zhang, Max Denis
- 8:40 - 9:00     *Fixed-time Synchronization of Coupled Inertial Neural Networks*  
Jiahao Xu, Peng Liu, Guolong Zeng, Jian Yong, Mengjie Zhu, Yiwei Shao
- 9:00 - 9:20     *Momentum-Accelerated Online Learning: Parameter-Learning Momentum Neurodynamic for Dynamic Linear Equations*  
Yang Si, Zhibin Li, Dongyang Fu
- 9:20 - 9:40     *A Deep Learning Algorithm for Extracting Shoreline Information in the Islands and Reefs of South China Sea*  
Huang Yu
- 9:40 - 10:00    *Robust Semantic Segmentation in 3D Gaussian Splatting via Dynamic Normalization and Geometric Outlier Filtering*  
Jie Gao, Mingyu Guan, Jiayin Li, Xiangguang Dai

**Sa2: Robotics and Control**

**Chairs: Yinyan Zhang and Liangming Chen**

- 10:00 - 10:20    *An Improved Neural Network for Time-Varying Sylvester Equation and Its Applications*  
Kunjian Li, Songjie Huang, Chengze Jiang, Xiuchun Xiao
- 10:20 - 10:40    *A Multi-start Iterated Local Search Algorithm for Electric Vehicle Routing Problem with Simultaneous Pickup and Delivery*  
Defeng Zhu, Huanyu Chen, Yane Hou

- 10:40 - 11:00    *Multi-Scale Attention U-Net for Real-Time Object Detection in Complex Scenes*  
Haixu You, Jun Xing, Xinzhe Wang, Jianchao Fan
- 11:00 - 11:20    *A Decentralized Stochastic Compositional Optimization Algorithm with Variance Reduction over Directed Networks*  
Chenglong He, Hanqing Hu, Xiangguang Dai, Wei Zhang, Qingguo Lü
- 11:20 - 11:40    *Advancing Marine Aquaculture Segmentation through Multi-Adversarial Transfer Learning*  
Yijie Wu, Shan Jiang, Xinzhe Wang, Jianchao Fan
- 11:40 - 12:00    *SDSI-SAM: Segment Anything Model-Guided Ship Detection in SAR Images*  
Chuhong Wang, Yu Xiao, Mingyang Sun, Dongyang Fu

**12:00-13:00    Lunch break**

**Sb1: Machine Learning**

**Chairs: Shenshen Gu and Xiuchun Xiao**

- 13:00 - 13:20    *Decoupling Tasking and Language: Modular Low-Rank Adaptation for Effective and Efficient Cross-Lingual Table Understanding*  
Ziqian Rao, Jun Wang
- 13:20 - 13:40    *A Novel Spatial Modulation System Based on Residual Autoencoder*  
Renjia Xin, Teng Shang, Jianchao Fan
- 13:40 - 14:00    *DePI: Towards Background-Decoupled and Prompt-Enhanced Text-to-Image Personalization*  
Yuxin Lin, Chunyang Zhang
- 14:00 - 14:20    *MambaAR-GNN: A Mamba-Enhanced Graph Neural Network with Adaptive Receptive Fields*  
Linzhi Feng, Chunyang Zhang
- 14:20 - 14:40    *Some Optimization Problems in Large Language Models*  
Hua Ding, Zhihui Zhan, Yi Jiang, Sam Kwong, Jun Zhang
- 14:40 - 15:00    *Stable Convergence and Global Convergence of Evolutionary Computation and Their Mutual Exclusivity Proof*  
Liuyue Luo, Zhihui Zhan

## **Sb2: Data Processing**

**Chairs: Hua Xiao and Yongji Guan**

- 15:00 - 15:20     *A Roulette Wheel Selection-based Data-driven Evolutionary Algorithm for Data-driven Optimization Problems*  
Xingyu Wang, Jianyu Li, Zhihui Zhan, Jun Zhang
- 15:20 - 15:40     *WCT: Window-Chemistry-Transformer Framework for Robust and Interpretable Near-Infrared Spectroscopic Quantification of Crop Nutrients*  
Jing Liang, Yu Xue, Hailong Feng, Bin Wang, Xiaoxuan Xu, Jing Xu
- 15:40 - 16:00     *3D Reconstruction Method for Strawberry Plants Based on 3D Gaussian Splatting and Edge Detection*  
JiaYin Li, Mingyu Guan, Jie Gao, Xiangguang Dai
- 16:00 - 16:20     *A Directional Scale-based Cosine Similarity Indicator for Adaptive Particle Swarm Optimization*  
Xingyu Wang, Jianyu Li, Zhihui Zhan, Jun Zhang
- 16:20 - 16:40     *EMFA-Net: A Deep Learning Model for Sea Ice Segmentation from SAR Imagery*  
Teng Shang, Renjia Xin, Jianchao Fan
- 16:40 - 17:00     *Improved Gazelle Optimization Algorithm with Hybrid Deep Learning-based Cybersecurity Solution for Cyber-Physical Systems*  
Hamed Alqahtani
- 17:00 - 17:20     *Internet of Things-Enabled Cyber Threat Detection in Self-Driving Vehicle Networks Using a Hybrid Deep Learning-Based Security Model*  
Mohammed Maray