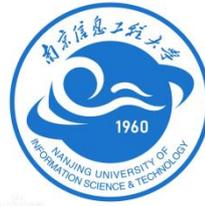


# 12th International Conference on Intelligent Control and Information Processing

ICICIP 2024

Sponsor



Nanjing University of Information Science and Technology

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IEEE Systems, Man and Cybernetics Society

## Welcome Messages

On behalf of the Organizing Committee, we sincerely welcome you to join us at the 12th International Conference on Intelligent Control and Information Processing (ICICIP 2024) being held in Nanjing, China, during March 8-10, 2024. Through this conference, we intend to carry out the exchange and discussion of new applications, new services, new theories and new technologies, and to help the development of intelligent control and information processing technology, open up to each other in the professional field, learn from each other, and provide a platform for experts and scholars from scientific research institutes, enterprises and institutions at home and abroad to exchange experience, discuss academic issues, display research results, and display their talents. At the same time, it helps participants to establish business or research connections and find global partners for future careers, so as to create a multi-participatory, collaborative and efficient innovation pattern. The conference features plenary speeches given by world renowned scholars and regular sessions with broad coverage and special topics.

ICICIP 2024 attracted about one hundred submissions, addressing the state-of-the-art development and research covering topics related to intelligent control and automation, intelligent information processing, image analysis and processing, computer vision and image processing, virtual and augmented reality, electronic technology and interactive systems. Based on the rigorous peer reviews by the Program Committee members and reviewers, 41 papers were selected to be presented in the conference and included in the conference proceedings.

The conference program is highlighted with two plenary talks. We would like to express our sincere appreciation and acknowledgement to the distinguished plenary speakers: Professor Yue Dong (RAE Foreign Academician, President of the School of Automation and the School of Artificial Intelligence at Nanjing University of Posts and Telecommunications) and Professor Honghai Liu (MAE Fellow, IEEE Fellow, IET Fellow, National Specially Appointed Expert). Plenary talks are focused on Intelligent Control and Information Processing.

Several organizations and many volunteers made great contributions toward the success of this conference. We would like to express our sincere gratitude to Nanjing University of Information Science & Technology for their sponsorship, City University of Hong Kong and Southeastern University for their co-sponsorship, and IEEE Systems for its technical co-sponsorship. Special thanks are extended to Program Committee Chairs and members for their thorough reviews of all the submissions, and the Organizing Committee and volunteers for their warm and thoughtful service to all participants. We also would like to express our high appreciation and gratitude to all of the authors and participants. Without the contributions of the authors, the conference will be impossible.

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

Zhenyu Lu, Jun Wang, General Chairs

Quanbo Ge, Wenwu Yu, Organizing Chairs

Long Cheng, Jianchao Fan, and Yousheng Xia, Program Chairs

## **Organizing Committee**

### **General Chairs**

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Jun Wang, City University of Hong Kong, Hong Kong

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Long Cheng, Institute of Automation, Chinese Academy of Sciences, Beijing, China

Jianchao Fan, Dalian University of Technology, Dalian, China

Yousheng Xia, Nanjing University of Information Science and Technology, Nanjing, China

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Qingshan Liu, Southeast University, Nanjing, China

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Jiasen Wang, Purple Mountain Laboratories, Nanjing, China

Xiaoxuan Wang, Nanjing University of Information Science and Technology, Nanjing, China

Qiang Yang, Nanjing University of Information Science and Technology, Nanjing, China

### **Registration Chairs**

Shenshen Gu, Shanghai University, Shanghai, China

Hai Huan, Nanjing University of Information Science and

Technology, Nanjing, China  
Shaofu Yang, Southeast University, Nanjing, China

### **Local Arrangements Chairs**

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Technology, Nanjing, China

Dongdong Xu, Nanjing University of Information Science and  
Technology, Nanjing, China

Jie Yang, Nanjing University of Information Science and  
Technology, Nanjing, China

## Program at a Glance

**March 8, 2024**

|             |  |
|-------------|--|
| Nanqi Hotel |  |
| 13:00-17:00 | Check-in Material pickup<br>Registration contact: Mingpeng Yang (Tel: 17826058209)<br>Accommodation contact: Jie Zhang (Tel.18914756232) |

**March 9, 2024**

|   |  |  |
|---|--|--|
| Lecture Hall (2nd floor), Binjiang Building, Nanjing University of Information Science and Technology, Nanjing, China |  |  |
| 9:00-9:10   | Opening Ceremony   |  |
| 9:10-10:10  | Keynote speech I: Professor Dong Yue   |  |
| 10:10-10:30   | Coffee break   |  |
| 10:30-11:30   | Keynote speech II : Professor Honghai Liu  |  |
| 11:30-13:00   | Lunch Break  |  |
|   | Onsite sessions<br>(Academic Lecture Hall A1715-1716, Information Technology Building) | Onsite sessions<br>(Academic Lecture Hall A1717-1718, Information Technology Building) |
| 13:00-15:00   | S1: Object Detection and Classification  | S3: Intelligent Optimization Methods   |
| 15:00-15:15   | Coffee break   |  |
| 15:15-17:30   | S2: Robotics and Automonous Systems  | S4: Analysis and Control of Networked Systems  |
| 18:00-20:00   | Banquet, Nanqi Hotel   |  |



Conference registration: NanQi Hotel

Lecture Hall: Binjiang Building

Academic Lecture Hall: Information Technology Building (Linjiang Building)

Lunch: Staff Restaurant

Banquet: Nanqi Hotel (WenChang Hall)

Walking from Nanqi Hotel to Binjiang Building: about 30mins

You can also take the campus shuttle bus. One yuan per trip

## Keynote Speech I

**Title: Active safety control of new power systems**

**Professor Dong Yue, Nanjing University of Posts and Telecommunication, China**

**Abstract:** This keynote introduces the information and physical security problems existing in the new power systems under the background of dual carbon, and the limitations of traditional methods to solve such security problems. Furthermore, three key scientific problems that need to be solved urgently are put forward, as well as the main contents and corresponding research programs to solve the above-mentioned key scientific problems.



**Biosketch:** Dong Yue is currently a professor and dean of the Institute of Advanced Technology and Director of Academic Committee of the University at Nanjing University of Posts and Telecommunication. He has been the Chair of IEEE IES Technical Committee on NCS and Applications and Chair of IEEE PES Smart Grid & Emerging Technologies Satellite Committee-China. Currently, he is the Co-Editor-in-Chief for IEEE Transactions on Industrial Informatics and the Associate Editor of IEEE Industrial Electronics Magazine, IEEE Transactions on Industrial Informatics, IEEE Transactions on Systems, Man and Cybernetics: Systems. He is the Foreign Member (Academician) of Russian Academy of Engineering and Fellow of IEEE/CAA/CAAI. Up to now, he has published more than 500 papers in international journals and 5 books in Chinese Science Press and Springer. He holds more than 90 patents. His research interests include analysis and synthesis of networked control systems, multi-agent systems, optimal control of power systems, and internet of things.

## Keynote Speech II

**Title: Explore functional corticomuscular coupled information for medical devices and systems**

**Professor Honghai Liu, HIT Shenzhen, China**

**Abstract:** Functional corticomuscular coupled information plays a crucial role in human motion science and applications that requires joint multidisciplinary efforts such as brain science and rehabilitation. This talk attempts to present the past, current and future of functional corticomuscular information interaction and its role in human centred medical systems. One of the problems is that majority of motor performance is assessed by subjective qualitative assessments based on individual movement protocols. It is evident that there is no unified standardized motor function metrics technology, restricting a wide spectrum of applications such as prosthetics, stroke rehabilitation. This talk presents the research outcomes of the lab led by the speaker with a goal of developing a metric framework to measure brain-body interaction information. The talk is concluded with research directions and open discussions.



**Biosketch:** Honghai Liu received his Ph.D from King' s College, University London, UK. He is a Professor at Harbin Institute of Technology, Shenzhen, China. He previously held appointments at King' s College London, University of Aberdeen, University of Portsmouth and project leader appointments in large-scale industrial control and system integration industry. He is interested in sensing and understanding for medical systems and applications with an emphasis on approaches that could make contribution to the intelligent connection of perception to action using contextual information.

He has authored/co-authored more than 200 peer-reviewed journals and conference papers. He is a member of Academia Europaea and IEEE Fellow .

**March 9, 2024**

**Chairs:** Zhenyu Lu

**Room:** Lecture Hall (2nd floor), Binjiang Building

9:00-9:10     **Opening Ceremony**

9:10-10:10   **Keynote Speech I: Prof. Dong Yue** - Active safety control of new power systems

10:10-10:30   Coffee Break

10:30-11:30   **Keynote Speech II: Prof. Honghai Liu** - Explore functional corticomuscular coupled information for medical devices and systems

11:30-13:00   Lunch break

**S1: Object Detection and Classification**

**Chairs:** Youshen Xia, Jianchao Fan

**Room:** Academic Lecture Hall A1715-1716, Information Technology Building

13:00-13:20    *Real-time Detection of Safety Helmet and Workwear Based on YOLOv7*

Piqi Tang, Jun Xing, Xinzhe Wang, Jianchao Fan

13:20-13:40    *A Small Object Detection Method for Cordyceps Based on Improved YOLOv8*

Guangjian Dai, Jicheng Yao, Jingsong Zhou, Li Shen, Tonglin Zhu, Yingsheng Hua

13:40-14:00    *Drug toxicity classification based on ReliefF and K-means algorithm*

Luyao Wang, Meirong Bai, Hongkai Zhao, Sen Qiu, Zhelong Wang, Hongyu Zhao

14:00-14:20    *Research on Collaborative Salient Object Detection Using Collaborative Feature Integration and Extraction*

Yachun Chen, Mengqi Lu, Yu Sun, Nina Zhang, Yanlong Zhou, Dehua Zhang

14:20 - 14:40    *An image decomposition-based enhancement method with matrix iteration learning*

Yao Xiao, Youshen Xia

14:40 - 15:00    *Improved YOLOv5-Based Method for Tiny Defect Detection on Steel Plate*

Jiwei Yu, Zhihang Ji, Yang Yu, Muhua Liu, Lin Wang, Xuhui Zhao, Ruijuan Zheng

**S2: Robotics and Autonomous Systems**

**Chairs:** Long Cheng, Zhouhua Peng

**Room:** Academic Lecture Hall A1715-1716, Information Technology Building

- 15:15 - 15:35 *Excavation Trajectory Research for Mining Electric Shovel using Sliding Mode Control Strategy based on Disturbance Observer*  
Hao Yu, Yu Tang, Gang Shen, Shuaifu Wang
- 15:35 - 15:55 *Encoding Variable Stiffness Skills with Interaction Force and Motion Information for Robot-Environment Interaction*  
Ran Cao, Long Cheng
- 15:55 - 16:15 *Underwater Robot Target Detection Based On Improved YOLOv5 Network*  
Siyuan Yuan, Xiaonan Luo, Ruishu Xu
- 16:15 - 16:35 *Digital Twin and Parallel Control for Automatic Berthing of Maritime Autonomous Surface Ships*  
Zhaochen Wang, Nan Gu, Ronghui Li, Dan Wang, Lu Liu, Zhouhua Peng
- 16:35 - 16:55 *An Early Warning Model for Equipment Based on State Vector and LSTM*  
Dongpo Liu, Qingmin Yu, Lei Zang, Qihong Yu, Qiuping Zheng, Sicong Yu
- 16:55 - 17:15 *Control of Unmanned Bicycle Based on Tensor Product Model Transformation and Hammersley Sampling Method*  
Depeng Xie, Degang Wang, Guoliang Zhao
- 17:15 - 17:30 *Dual-wavelength Phase-tilting Iteration and Local Time-shifting Least Squares for Dual-channel Dynamic white-light interferometry*  
Mingliang Duan, Yi Zong, Zhenyu Lu, Jianxin Li

### **S3: Intelligent Optimization Methods**

**Chairs:** Zhenyu Lu, Shenshen Gu

**Room:** Academic Lecture Hall A1717-1718, Information Technology Building

- 13:00-13:20 *Improving Optimizers by Runge-Kutta Method: A case study of SGD and Adam*  
Dan Su, Qihai Jiang, Enhong Liu, Mei Liu
- 13:20-13:40 *Placement path optimization of placement machine based on rule learning iterative method*  
Liwu Yu, Zhiguang Feng
- 13:40-14:00 *Analytic Hierarchy Process-based control system optimization for buck circuit using genetic algorithm*  
Xuan Yang, Xudong Gao Wenjie Cao, Songlin Xu

- 14:00-14:20 *A Method for Large Scale Unconstrained Binary Quadratic Programming Problem Based on Graph Neural Network*  
Jiajia Huang, Shenshen Gu
- 14:20 - 14:40 *Adaptive Deep Neural Network Optimized Backstepping Control for a Class of Nonlinear Strict-Feedback Systems*  
Jian Wu, Hongwei Lu, Wei Wang
- 14:40 - 15:00 *Adaptive Crossover Selection for Differential Evolution to Solve Global Optimization Problems*  
Islam Taharimul, Zhuo-Yin Qiao, Qiang Yang, Xu-Dong Gao, and Zhen-Yu Lu

#### **S4: Analysis and Control of Networked Systems**

**Chairs:** Qingshan Liu, Sitian Qin

**Room:** Academic Lecture Hall A1717-1718, Information Technology Building

- 15:15 - 15:35 *Tendency Coefficient-Based Weighted Distance Measure for Intuitionistic Fuzzy Sets with Applications*  
Manasseh Terna Anum, Hanyin Zhang, Paul Augustine Ejegwa, Yuming Feng
- 15:35 - 15:55 *Higher-order Link Prediction Based on Message Passing Simplicial Networks*  
Jun Fu, Chen Chao
- 15:55 - 16:15 *Observer-based Resilient Consensus for Multi-agent Systems Modeled by PDEs under DoS Attacks*  
Chuanhai Yang, Qingshan Liu
- 16:15 - 16:35 *Data-driven Optimal Traffic Signal Control with Phase Priority and Switching Cost*  
Xiaofeng Li, Jiahui Jiang
- 16:35 - 16:55 *On the Connection between Saliency Guided Training and Robustness in Deep Neural Networks*  
Ali Karkehabadi, Parisa Oftadeh, Danial Shafaie, Jamshid Hassanpour
- 16:55 - 17:15 *Distributed Nash Equilibrium Seeking for High-Order Dynamics with Event-Triggered Communication*  
Zhijie Chen, Jianing Chen, Zexiang Li, and Sitian Qin
- 17:15 - 17:30 *Adaptive Leadership in Formation Control Using  $k$ -WTA and Improved Artificial Potential Fields*  
Yang Liu, Ning Tan