Final Program

The 2023 Nineteenth International Conference on Intelligent Computing

August 10-13, 2023
Zhengzhou, China

The 2023 Nineteenth International Conference on Intelligent Computing

FINAL PROGRAM

August 10-13, 2023

Zhengzhou, China

Outlines

WELCOME MESSAGE FROM GENERAL CHAIRS

The International Conference on Intelligent Computing (ICIC) was started to provide an annual forum dedicated to the emerging and challenging topics in artificial intelligence, machine learning, pattern recognition, bioinformatics, and computational biology. It aims to bring together researchers and practitioners from both academia and industry to share ideas, problems, and solutions related to the multifaceted aspects of intelligent computing.

ICIC 2023, held in Zhengzhou, China, August 10-13, 2023, constituted the 19th International Conference on Intelligent Computing. It built upon the success of ICIC 2022 (Xi'an, China), ICIC 2021 (Shenzhen, China), ICIC 2020 (Bari, Italy), ICIC 2019 (Nanchang, China), ICIC 2018 (Wuhan, China), ICIC 2017 (Liverpool, UK), ICIC 2016 (Lanzhou, China), ICIC 2015 (Fuzhou, China), ICIC 2014 (Taiyuan, China), ICIC 2013 (Nanning, China), ICIC 2012 (Huangshan, China), ICIC 2011 (Zhengzhou, China), ICIC 2010 (Changsha, China), ICIC 2009 (Ulsan, South Korea), ICIC 2008 (Shanghai, China), ICIC 2007 (Qingdao, China), ICIC 2006 (Kunming, China), and ICIC 2005 (Hefei, China).

This year, the conference concentrated mainly on the theories and methodologies as well as the emerging applications of intelligent computing. Its aim was to unify the picture of contemporary intelligent computing techniques as an integral concept that highlights the trends in advanced computational intelligence and bridges theoretical research with applications. Therefore, the theme for this conference was "Advanced Intelligent Computing Technology and Applications". Papers that focused on this theme were solicited, addressing theories, methodologies, and applications in science and technology.

ICIC 2023 received 828 submissions from 14 countries and regions. All papers went through a rigorous peer-review procedure and each paper received at least three review reports. Based on the review reports, the Program Committee finally selected 337 high-quality papers for presentation at ICIC

2023, included in five volumes of proceedings published by Springer: three volumes of Lecture Notes in Computer Science (LNCS), and two volumes of Lecture Notes in Artificial Intelligence (LNAI).

The organizers of ICIC 2023, including Eastern Institute of Technology, and Zhengzhou University of Light Industry, China, made an enormous effort to ensure the success of the conference. We hereby would like to thank the members of the Program Committee and the referees for their collective effort in reviewing and soliciting the papers. In particular, we would like to thank all the authors for contributing their papers. Without the high-quality submissions from the authors, the success of the conference would not have been possible. Finally, we are especially grateful to the International Neural Network Society, and the National Science Foundation of China for their sponsorship.

ICIC 2023 General Chairs
De-Shuang Huang, Shizhong Wei

Organization

General Co-Chairs

De-Shuang Huang, Eastern Institute of Technology, China
Shizhong Wei, Zhengzhou University of Light Industry, China

Program Committee Co-Chairs

Prashan Premaratne, University of Wollongong, Australia
Boyang Qu, Zhong Yuan University of Technology，China
Baohua Jin, Zhengzhou University of Light Industry, China
Kang-Hyun Jo, University of Ulsan, Korea
Abir Hussain, Liverpool John Moores University, UK

Organizing Committee Co-Chairs

Xiao Zhang, Zhengzhou University of Light Industry, China
Boyang Qu, Zhongyuan University of Technology, China
Kaili Shao, Huanghe S&T University,China
Yuguo Wu, Zhengzhou Normal University, China

Organizing Committee Members

Fubao Zhu, Zhengzhou University of Light Industry, China
Wei Huang, Zhengzhou University of Light Industry, China
Chenggang Xu, Henan University of Chinese Medicine, China
Tao Wei, Henan University of Engineering, China
Zhijuan Jia, Zhengzhou Normal University, China
Hui Fu, Huanghe S&T University,China
Wei Liu, Shenzhen Institute of Information Technology, China

Award Committee Co-Chairs

Michal Choras, University of Science and Technology, Poland

Hong-Hee Lee, University of Ulsan, Republic of Korea

Tutorial Co-Chairs

Yoshinori Kuno, Saitama University, Japan
Phalguni Gupta, Indian Institute of Technology Kanpur, India
Huaiguang Wu, Zhengzhou University of Light Industry, China

Publication Co-Chairs

Valeriya Gribova, Far Eastern Branch of Russian Academy of Sciences, Russia
M. Michael Gromiha, Indian Institute of Technology Madras, India
Yin Du, Zhengzhou Normal University, China

Special Session Co-Chairs

Jair Cervantes Canales, Autonomous University of Mexico State, Mexico
Chenxi Huang, Xiamen University, China
Dhiya Al-Jumeily, Liverpool John Moores University, UK
Da Xiao,Huanghe S&T University,China

Special Issue Co-Chairs

Kyungsook Han, Inha University, Republic of Korea
Laurent Heutte, Université de Rouen, France
Huifang Guo, Huanghe S&T University,China

International Liaison Co-Chairs

Prashan Premaratne, University of Wollongong, Australia

Workshop Co-Chairs

Yu-Dong Zhang, University of Leicester, UK
Hee-Jun Kang, University of Ulsan, Republic of Korea
Qiuwen Zhang, Zhengzhou University of Light Industry, China

Publicity Co-Chairs

Chun-Hou Zheng, Anhui University, China
Dhiya Al-Jumeily, Liverpool John Moores University, UK
Jair Cervantes Canales, Autonomous University of Mexico State, Mexico
Yuchu He, Zhengzhou Normal University, China

Sponsors & Exhibits Chair

Fubao Zhu, Zhengzhou University of Light Industry, China

Program Committee Members

Abir Hussain, Liverpool John Moores University, United Kingdom
Antonio Brunetti, Polytechnic University of Bari, Italy
Antonino Staiano, Università di Napoli Parthenope, Italy
Bin Liu, Beijing Institute of Technology, China
Bin Qian, Kunming University of Science and Technology, China
Bin Yang, Zaozhuang University, China
Bing Wang, Anhui University of Technology, China
Binhua Tang, Hohai University, China
Bingqiang Liu, Shandong University, China
Bo Li, Wuhan University of Science and Technology, China
Changqing Shen, Soochow University, China
Chao Song, Harbin medical university, China
Chenxi Huang, Xiamen University, China
Chin-Chih Chang, Chung Hua University, Taiwan, China
Chunhou Zheng, Anhui University, China
Chunmei Liu, Howard University, United States
Chunquan Li, University of South China, China
Dahjing Jwo, National Taiwan Ocean University, Taiwan, China
Dakshina Ranjan Kisku, National Institute of Technology Durgapur, India
Dan Feng, Huazhong University of Science and Technology, China

Daowen Qiu, Sun Yat-sen University, China
Dharmalingam Muthusamy, Bharathiar University, India
Dhiya Al-Jumeily OBE, Liverpool John Moores University, United Kingdom
Dong Wang, university of Jinan, China
Dunwei Gong, China University of MIning and Technology, China
Eros Gian Pasero, Politecnico di Torino, Italy
Evi Sjukur, Monash University, Australia
Fa Zhang, Beijing Institute of Technology, China
Fengfeng Zhou, Jilin University, China
Fei Guo, Central South University, China
Gaoxiang Ouyang, Beijing Normal University, China
Giovanni Dimauro, Department of Computer Science - University o Bari, Italy
Guangwu Hu, Shenzhen Institute of Information Technology, China
Guoliang Li, Huazhong Agricultural University, China
Han Zhang, Nankai University, China
Haibin Liu, Beijing University of Technology, China
Hao Lin, University of Electronic Science and Technology of China, China
Haodi Feng, Shandong University, China
Haodong Zhu, Zhengzhou University of Light Industry, China
Hongjie Wu, Suzhou University of Science and Technology, China
Hongmin Cai, South China University of Technology, China
Hongwei Tao, Zhengzhou University of Light Industry, China
Jair Cervantes, Autonomous University of Mexico state, Mexico
Jiaofen Nan, Zhengzhou University of Light Industry, China
Jian Huang, University of Electronic Science and Technology of China, China
Jian Wang, China University of Petroleum, China
Jiangning Song, Monash University, Australia, Australia
Jiawei Luo, Hunan University, China
Jing Hu, Wuhan University of Science and Technology, China
Jinwen Ma, Peking University, China

Prashan Premaratne, University of Wollongong, Australia
Pufeng Du, College of Intelligence and Computing, China
Qi Zhao, University of Science and Technology Liaoning, China
Qingfeng Chen, Guangxi University, China
Qinghua Jiang, Harbin Institute of Technology, China
Quan Zou, University of Electronic Science and Technology of China, China
Rui Wang, National University of Defense Technology, China
Saiful Islam, Aligarh Muslim University, India
Seeja K R, Indira Gandhi Delhi Technical University for Women, India
Shanfeng Zhu, Fudan University, China
Shikui Tu, Shanghai Jiao Tong University, China
Shitong Wang, JiangNan University, China
Shixiong Zhang, Xidian University, China
Sungshin Kim, Pusan National University, Republic of Korea
Surya Prakash, IIT Indore, India
Tatsuya Akutsu, Kyoto University, Japan
Tao Zeng, Guangzhou Laboratory, China
Tieshan Li, University of Electronic Science and Technology of China, China
Valeriya Gribova, Institute of Automation and Control Processes, Far Eastern Branch of Russian Academy of Sciences, Russia
Vincenzo Randazzo, Politecnico di Torino, Italy
Waqas Haider, Kohsar University Murree, Murree, Pakistan
Wen Zhang, Huazhong Agricultural University, China
Wenbin Liu, Guangzhou university, China
Wensheng Chen, Shenzhen University, China
Wei Chen, Chengdu University of Traditional Chinese Medicine, China
Wei Peng, Kunming University of Science and Technology, China
Weichiang Hong, Asia Eastern University of Science and Technology, Taiwan, China
Weidong Chen, Shanghai Jiao Tong University, China

Weiwei Kong, Xi'an University of Posts and Telecommunications, China
Weiwei Zhang, Zhengzhou University of Light Industry, China
Weixiang Liu, Shenzhen University, China
Xiaodi Li, Shandong Normal University, China
Xiaoli Lin, Wuhan University of Science and Technology, China
Xiaofeng Wang, Hefei University, China
Xiaohua Yu, California Polytechnic State University, United States
Xiaoke Ma, Xidian University, China
Xiaolei Zhu, Anhui Agricultural University, China
Xiaoyong Guo, Henan University of Engineering, China
Xiangtao Li, Jilin University, China
Xin Zhang, Jiangnan University, China
Xinguo Lu, Hunan University, China
Xingwei Wang, Northeastern University, China
Xinzheng Xu, China University of Mining and Technology, China
Xiwei Liu, Tongji University, China
Xiyuan Chen, Southeast Univ., China
Xuekun Song，Henan University of Chinese Medicine,China
Xuequn Shang, Northwestern Polytechnical University, China
Xuesong Wang, China University of Mining and Technology, China
Yali Lv,Henan University of Chinese Medicine,China
Yansen Su, Anhui University, China
Yi Xiong, Shanghai Jiao Tong University, China
Yu Xue, Huazhong University of Science and Technology, China
Yizhang Jiang, Jiangnan University, China
Yonggang Lu, Lanzhou University, China
Yongquan Zhou, Guangxi University for Nationalities, China
Yudong Zhang, University of Leicester, United Kingdom
Yunhai Wang, Shandong university, China
Yupei Zhang, Northwestern Polytechnical University, China

Yushan Qiu, Shenzhen University, China
Yunxia Liu, Zhengzhou Normal Unibersity, China
Zhanli Sun, Anhui University, China
Zhenran Jiang, East China Normal University, China
Zhengtao Yu, Kunming University of Science and Technology, China
Zhenyu Xuan, University of Texas at Dallas, United States
Zhihong Guan, Huazhong University of Science and Technology, China
Zhihua Cui, Taiyuan University of Science and Technology, China
Zhiping Liu, Shandong University, China
Zhiqiang Geng, Beijing University of Chemical Technology, China
Zhongqiu Zhao, Hefei University of Technology, China
Zhuhong You, Northwestern Polytechnical University, China

Reviewers

Wan Hussain Wan Ishak
Nureize Arbaiy
Shingo Mabu
Lianming Zhang
Xiao Yu
Shaohua Li
Yuntao Wei
Jinglong Wu
Wei-Chiang Hong
Sungshin Kim
Tianhua Guan
Shutao Mei
Yuelin Sun
Hai-Cheng Yi
Zhan-Heng Chen
Suwen Zhao
Medha Pandey
Mike Dyall-Smith
Xin Hong
Ziyi Chen
Xiwei Tang
Khanh Le
Shulin Wang
Di Zhang
Sijia Zhang
Na Cheng
Menglu Li
zhenhao guo
Limin Jiang
Kun Zhan
Cheng-Hsiung Chiang
Yuqi Wang
Anna Esposito
Salvatore Vitabile
Bahattin Karakaya
Tejaswini Mallavarapu
Sheng Yang
Heutte Laurent
Seeja
Pu-Feng Du
Wei Chen
Jonggeun Kim
Eun Kyeong Kim
Hansoo Lee
Yiqiao Cai
Wuritu Yang
Weitao Sun
Shou-Tao Xu
Min-You Chen
Yajuan Zhang
Guihua Tao
Jinzhong Zhang
Wenjie Yi
Miguel Gomez
Lingyun Huang
Chao Chen
Jiangping He
Jin Ma
Xiao Yang
Sotanto Sotanto
Liang Xu
chaomin luo
Rohitash Chandra
Hui Ma
Lei Deng
Di Liu
María I. Giménez
Ansgar Poetsch
Dimitry Y. Sorokin
Jill F. Banfield
Can Alkan
Ji-Xiang Du
Xiao-Feng Wang
Zhong-Qiu Zhao
Bo Li
Zhong rui Zhang
Yanyun Qu
Shunlin Wang
Jin-Xing Liu
Shravan Sukumar
Long Gao
Yifei Wu
Qi Yan
Tianhua Jiang
Fangping Wan
Lixiang Hong
Sai Zhang
Tingzhong Tian
Qi Zhao
Leyi Wei
Lianrong Pu
Chong SHEN
Junwei Wang
Zhe Yan
Rui Song

Xin Shao
Xinhua Tang
Claudia Guldimann
Saad Abdullah Khan
Bangyal
Giansalvo Cirrincione
Bing Wang
xiao xiancui
X Zheng
Vincenzo Randazzo
Huijuan Zhu
DongYuan Li
Jingbo Xia
Boya Ji
Manilo Monaco
Xiao-Hua Yu
Pierre Leblond
Zu-Guo Yu
Jun Yuan
Shenggen Zheng
Xiong Chunhe
punam Kumari
Li Shang
Sandy Sgorlon
Bo wei Zhao
XJ Chen
Fang YU
Takashi Kurmeoto
Huakuang Li
Pallavi Pandey
Yan Zhou
Mascot Wang
Chenhui Qiu
Haizhou Wu
Lulu Zuo

Jiangning Song
Rafal Kozik
Wenyan Gu
Shiyin Tan
Yaping Fang
Xiuxiu Ren
Antonino Staiano
Aniello Castiglione
Qiong Wu
Atif Mehmood
Wang Guangzhong
Zheng Tian
Junyi Chen
meineng wang
Xiaorui Su
Jianping Yu
Jair Cervantes
Lizhi Liu
Junwei Luo
yuanyuan wang
Jiayin Zhou
Mingyi Wang
Xiaolei Zhu
Jiafan Zhu
Yongle Li
Hao Lin
Xiaoyin Xu
Shiwei Sun
Hongxuan Hua
Shiping Zhang
YuxiangTian
Zhenjia Wang
Shuqin Zhang
Angelo Riccio
Francesco Camastra

Xiong Yuanpeng
Jing Xu
Zou Zeyu
Y. H. Tsai
Chien-Yuan Lai
Guo-Feng Fan
Shaoming Pan
De-Xuan Zou
Zheng Chen
Renzhi Cao
Ronggen Yang
Azis Azis
Shelli Shelli
Zhongming Zhao
Yongna Yuan
Kamal Al Nasr
Chuanxing Liu
Panpan Song
Joao Sousa
Min Li
Wenying He
Kaikai Xu
Ming Chen
Laura Dominguez Jalili
Vivek Kanhangad
Zhang Ziqi
Davide Nardone
Liangxu Liu
Huijian Han
Qingjun Zhu
Hongluan Zhao
Chyuan-Huei Thomas Yang
R. S. Lin
N. Nezu

Chin-Chih Chang
Hung-Chi Su
Antonio Brunetti
Xie conghua
Caitong Yue
Li Yan
Tuozhong Yao
Xuzhao Chai
Zhenhu Liang
Yu Lu
Hua Tang
Liang Cheng
Jiang Hui
Puneet Rawat
Kulandaisamy
Akila
Niu Xiaohui
Zhang Guoliang
Egidio Falotico
Peng Chen
Cheng Wang
He Chen
Giacomo Donato
Cascarano
Vitoantonio Bevilacqua
shaohua Wan
Jaya Sudha J.S
Sameena Naaz
Cheng Chen
Jie Li
Ruxin Zhao
Jiazhou Chen
Abeer Alsadhan
Guoliang Xu
Fangli Yang
Congxu Zhu
Deng Li
Piyush Joshi
Syed Sadaf Ali
Qin Wei
Kuan Li
Teng Wan
Hao Liu
Yexian Zhang
Xu Qiao
Ce Li
Lingchong Zhong
Wenyan Wang
Xiaoyu Ji
Weifeng Guo
Yuchen Jiang
Yuanyuan Huang
Zaixing Sun
Honglin Zhang
Yu Jie HE
Benjamin Soibam
Sungroh Yoon
Mohamed Chaabane
Rong Hu
youjie yao
NaiKang Yu
Carlo Bianca
Giulia Russo
Dian Liu
Cheng Liang
Iyyakutti Iyappan
Ganapathi
Mingon Kang
zhang chuanchao
Hao Dai
Geethan
Brendan Halloran
Yue Li
Qianqian Shi
Zhiqiang Tian
Yang Yang
Jalilah Arijah Mohd
Kamarudin
Jun Wang
Ke Yan
Hang Wei
David A Hendrix
Ka-Chun Wong
Yuyan Han
Hisato Fukuda
Yaning Yang
Lixiang Xu
Yuanke Zhou
Shihui Ying
Wenqiang Fan
Zhao Li
Zhe Zhang
Xiaoying Guo
Yiqi Jiang
Zhuoqun Xia
Jing Sun
Na Geng
Chen Li
Xin Ding
Balachandran
Manavalan
Bingqiang Liu
Lianrong Pu
Di Wang
Fangping Wan

Guosheng Han
Renmeng Liu
Yinan Guo
Lujie Fang
Ying Zhang
Yinghao Cao
xhize wu
Le Zou
G. Brian Golding
Viktoriya Coneva
Alexandre Rossi
Paschoal
Ambuj Srivastava
Prabakaran R
Xingquan Zuo
Jiabin Huang
Jingwen Yang
Liu Qianying
Markus J. Ankenbrand
Jianghong Meng
tongchi zhou
Zhi-Ping Liu
Xinyan Liang
Xiaopeng Jin
Jun Zhang
Yumeng Liu
Junliang Shang
LM Xiao
Shang-han Li
Jianhua Zhang
Han-Jing Jiang
Daniele Nardi
Kunikazu
Shenglin Mu
Jing Liang
Jialing Li
Yu-Wen-Tian Sun
Zhe Sun
Wentao Fan
Wei Lan
Jiancheng Zhong
Josue Espejel Cabrera
José Sergio Ruiz Castilla
Juan de Jesus Amador Nanxun Wang
Rencai Zhou
Moli Huang
Yong Zhang
Daniele Loiacono
Grzegorz Dudek
Joaquín Torres-Sospedra
Xingjian CHEN
Saifur Rahaman
Olutomilayo Petinrin
Xiaoming Liu
Xin Xu
Zi-Qi Zhu
Ms.Punam Kumari
Ms.Pallavy Pandey
Najme Zehra
Zhenqing Ye
Hao Zhang
Zijing Wang
Lida Zhu
Lvzhou Li
Junfeng Xia
Jianguo Liu
Jia-Xiang Wang
Gongxin Peng
Junbo Liang
Linjing Liu
Xian Geng
Sheng Ding
Jun Li
Laksono Kurnianggoro
Minxia Cheng
Meiyi Li
Qizhi Zhu
PengChao Li
Ming Xiao
Guangdi Liu
Jing Meng
Kang Xu
Cong Feng
Arturo Yee
Yi Xiong
Fei Luo
Xionghui Zhou
Kazunori Onoguchi
Hotaka Takizawa
Suhang Gu
Zhang Yu
Bin Qin
Yang Gu
Zhibin Jiang
Chuanyan Wu
Wahyono Wahyono
Van-Dung Hoang
My-Ha Le
Kaushik Deb
Danilo Caceres
Alexander Filonenko
Van-Thanh Hoang

Ning Guo
Deng Chao
Soniya Balram
Jian Liu
Angelo Ciaramella
Yijie Ding
Ramakrishnan
Nagarajan Raju
Kumar Yugandhar
Anoosha Paruchuri
Dhanusa
jino blessy
Agata Gie
Lei Che
Yujia Xi
Ma Haiying
Huanqiang Zeng
Hong-Bo Zhang
Yewang Chen
Farheen Sidiqqui
Sama Ukyo
Parul Agarwal
Akash Tayal
Ru Yang
Junning Gao
Jianqing Zhu
Joel Ayala
Haizhou Liu
Nobutaka Shimada
Yuan Xu
Ping Yang
Chunfeng Shi
Shuo Jiang
Xiaoke Hao
Lei Wang
Minghua Zhao
Cheng Shi
Jiulong Zhang
Shui-Hua Wang
Xuefeng Cui
Sandesh Gupta
Nadia Siddiqui
Syeda Shira Moin
Sajjad Ahmed
Ruidong Li
Mauro Castelli
Leonardo Bocchi
Leonardo Vanneschi
Ivanoe De Falco
Antonio Della Cioppa
Kamlesh Tiwari
Puneet Gupta
Zuliang Wang
Luca Tiseni
Francesco Porcini
Ruizhi Fan
Grigorios Skaltsas
Mario Selvaggio
Xiang Yu
Abdurrahman Eray
Baran
Alessandra Rossi
Jacky Liang
Robin Strudel
Stefan Stevsic
Ariyan M. Kabir
Lin Shao
Parker Owan
Rafael Papallas
Alina Kloss
Muhammad Suhail
Saleem
Neel Doshi
Masaki Murooka
Huitan Mao
Christos K. Verginis
Joon Hyub Lee
Gennaro Notomista
Donghyeon Lee
Mohamed Hasan
ChangHwan Kim
Vivek Thangavelu
Alvaro Costa-Garcia
David Parent
Oskar Ljungqvist
Long Cheng
Huajuan Huang
Vasily Aristarkhov
Zhonghao Liu
Lichuan Pan
Yongquan Zhou
Zhongying Zhao
Kunikazu Kobayashi
Masato Nagayoshi
Atsushi Yamashita
Wei Peng
Haodi Feng
Jin Zhao
Shunheng Zhou
Xinguo Lu
Xiangwen Wang
Zhe Liu
Pi-Jing Wei
Bin Liu
Haozhen Situ

Meng Zhou
Muhammad Ikram Ullah
Hui Tang
Sakthivel Ramasamy
Akio Nakamura
Antony Lam
Weilin Deng
Haiyan Qiao
Xu Zhou
Shuyuan Wang
Rabia Shakir
Shixiong Zhang
Xuanfan Fei
Fatih Ad
Aysel ersoy Yilmaz
Haotian Xu
zekang bian
Shuguang Ge
Dhiya Al-Jumeily
Thar Baker
Haoqian Huang
Siguo Wang
Huan Liu
Jianqing Chen
Chunhui Wang
Xiaoshu Zhu
Wen Zhang
Yongchun Zuo
Dariusz Pazderski
Elif Hocaoglu
hyunsoo kim
Park Singu
Saeed Ahmed
Youngdoo Lee
Nathan D. Kent
Areesha Anjum
Sanjay Sharma
Shaojin Geng
Andrea Mannini
Van-Dung Hoang
He yongqiang
Kyungsook Han
Long Chen
Jialin Lyu
Zhenyang Li
Tian Rui
Khan Alcan
Alperen Acemoglu
Duygun Erol Barkana
Juan Manuel Jacinto Villegas
Zhenishbek Zhakypov
Domenico Chiaradia
Huiyu Zhou
Yichuan Wang
Sang-Goo Jeong
Nicolò Navarin
Eray A. Baran
Jiakai Ding
Dehua Zhang
Giuseppe Pirlo
Alberto Morea
Giuseppe Mastronardi
Insoo Koo
Dah-Jing Jwo
Yudong Zhang
Zafaryab Haider
Mahreen Saleem
Quang Do
Vladimir Shakhov
Daniele Leonardis
Simona Crea
Byungkyu Park
Pau Rodr&acute
Alper Gün
Mehmet Fatih Demirel
Elena Battini
Radzi Ambar
Mohamad farhan
Mohamad mohsin
Nur Azzah Abu Bakar
Noraziah ChePa
Sasalak Tongkaw
Kumar Jana
Hafizul Fahri Hanafi
Liu Jinxing
Alex Moopenn
Liang Liang
Ling-Yun Dai
Raffaele Montella
Maratea Antonio
Xiongtao zhang
Sobia Pervaiz Iqbal
Fang Yang
Si Liu
Natsa Kleanthous
Zhen Shen
Jing Jiang
Shamrie Sainin
Suraya Alias
Mohd Hanafi Ahmad Hijazi
Mohd Razali Tomari
Chunyan Fan

Jie Zhao
Yuchen Zhang
Casimiro
Dong-Jun Yu
Jianwei Yang
Wenrui Zhao
Di Wu
Chao Wang
Alex Akinbi
Fuyi Li
Fan Xu
Guangsheng Wu
Yuchong Gong
Weitai Yang
Mohammed Aledhari
Yanan Wang
Bo Chen
Binbin Pan
Chunhou Zheng
Abir Hussain
Chen Yan
Dhanjay Singh
Bowen Song
Guojing
Weiping Liu
Yeguo Liao
Laura Jalili
Quan Zou
Xing Chen
Xiujuan Lei
Marek Pawlicki
Haiying Ma
Hao Zhu
Wang Zhanjun
Mohamed Alloghani
Yu Hu
Haya Alaskar
Baohua Wang
Hanfu Wang
Hongle Xie
Guangming Wang
Yongmei Liu
Fuchun Liu
Farid Garcia-Lamont
Yang Li
Hengyue Shi
Gao Kun
Wenzheng Ma
Jin Sun
Ruiwen Xing
Lianxin Zhong
Hongyuan Zhang
Han Xupeng
Mon Hian Chew
Jianxun Mi
Michele Scarpiniti
Hugo Morais
Alamgir Hossain
Felipe Saraiva
xuyang xuyang
Yasushi Mae
Haoran Mo
Pengfei Cui
Yoshinori Kobayashi
Qing Yu Cui
Kongtao Chen
Feng Feng
Wenli Yan
Zhibo Wang
Ying Qiao
Qiyue Lu
Geethan Mendiz
Dong Li
Di Liu
Feilin Zhang
Haibin Li
Heqi Wang
Wei Wang
Tony Hao
Yingxia Pan
Chenglong Wei
My Ha Le
Yu Chen
Eren Aydemir
Naida Fetic
Bing Sun
Zhenzhong Chu
Meijing Li
Wentao Chen
Mingpeng Zheng
Zhihao Tang
Li keng Liang
Alberto Mazzoni
Domenico Buongiorno
Zhang Lifeng
Chi Yuhong
Meng-Meng Yin
Yannan Bin
Wasiq Khan
Yong Wu
Qinhu Zhang
Jiang Liu
Yuzhen Han
Pengcheng Xiao
Harry Haoxiang Wang

Fengqiang Li
Chenggang Lai
Dong Li
Shuai Liu
Cuiling Huang
Lian-Yong Qi
Qi Zhu
Wenqiang Gu
Haitao Du
Bingbo Cui
Qinghua Li
Xin Juan
Emanuele Principi
Xiaohan Sun
Inas Kadhim
Jing Feng
Xin Juan
Hongguo Zhao
Masoomeh Mirrashid
Jialiang Li
Yaping Hu
Xiangzhen Kong
Mi-Xiao Hou
Zhen Cui
Juan Wang
Na Yu
Meiyu Duan
Pavel Osinenko
Chengdong Li
Stefano Rovetta
Mingjun Zhong
Baoping Yuan
Akhilesh Mohan Srivastatva
Vivek Baghel
Umarani Jayaraman
Somnath Dey
Guanghui Li
Lihong Peng
Wei Zhang
Hailin Chen
Fabio Bellavia
Giosue' Lo Bosco
Giuseppe Salvi
Giovanni Acampora
Zhen Chen
Enrico De Santis
Xing Lining
Wu Guohua
Dong Nanjiang
Jhony Heriberto Giraldo Zuluaga
Waqas Haider Bangyal
CongFeng
Autilia Vitiello
TingTing Dan
Haiyan Wang
Angelo Casolaro
Dandan Lu
Bin Zhang
Raul Montoliu
Sergio Trilles
Xu Yang
Fan Jiao
Li Kaiwen
Wenhua Li
Ming Mengjun
Ma Wubin
Cuco Cristanno
Chao Wu
Ghada Abdelmoumin
Han-Zhou Wu
Antonio Junior Spoleto
Zhenghao Shi
Ya Wang
Tao Li
shuyi zhang
Xiaoqing Li
Yajun Zou
Chuanlei Zhang
Berardino Prencipe
Feng Liu
Yongsheng Dong
Yatong Zhou
Carlo Croce
Rong Fei
Zhen Wang
Huai-Ping Jin
Mingzhe She
Sen Zhang
Yifan Zheng
Christophe Guyeux
Jun Sang
huang wenzhun
Jun Wu
Jing Luo
Wei Lu
Heungkyu Lee
Yinlong Qian
Hong wang
Daniele Malitesta
Fenqiang Zhao
Xinghuo Ye
Hongyi Zhang
Xuexin Yu

Guanshuo Xu
Mehdi Yedroudj
Xujun Duan
Xing-Ming Zhao
Jiayan Han
Yan Xiao
Weizhong Lu
Weiguo Shen
Hongzhen Shi
Zeng Shangyou
Zhou Yue
TaeMoon Seo
Sergio Cannata
Weiqi Luo
Feng Yanyan
Pan Bing
Jiwen Dong
Yong-Wan Kwon
Heng Chen
S.T. Veena
J. Anita Christaline
R. Ramesh
Shadrokh Samavi
Amin Khatami
Min Chen
He Huang
Qing Lei
Shuang Ye
Francesco Fontanella
Kang Jijia
Rahul Kumar
Alessandra Scotto
Freca
Nicole Cilia
Alessandro Aliberti
Gabriele Ciravegna
Jacopo Ferretti
Jing Yang
Zheheng Jiang
Dan Yang
Dongxue Peng
Wenting Cui
Francescomaria Marino
Wenhao Chi
Ruobing Liang
Feixiang Zhou
Jijia Kang
Xinshao Wang
Huawei Huang
Zhi Zhou
Yanrui Ding
Peng Li
Yunfeng Zhao
Guohong Qi
Xiaoyan Hu
Li Guo
Xia-an Bi
Xiuquan Du
Ping Zhu
Young-Seob Jeong
Han-Gyu Kim
Dongkun Lee
Jonghwan Hyeon
Chae-Gyun Lim
Nicola Altini
Claudio Gallicchio
Dingna Duan
Shiqiang Ma
Mingliang Dou
Jansen woo
Shanshan
ShanShan Hu
Hai-tao Li
Francescomaria Marino
Jiayi Ji
Jun Peng
Jie Hu
Jipeng Wu
Shirley Meng
Prashan Premaratne
Lucia Ballerini
Haifeng Hu
JianXin Zhang
Xiaoxiao Sun
Shaomin Mu
Yongyu Xu
Jingyu Hou
Zhixian Liu

Sponsors

Co-organized by	
	宁波东方理工大学（暂名） **Eastern Institute of Technology**
	郑州轻工业大学 **Zhengzhou University of Light Industry**
	中原工学院 **Zhongyuan University of Technology**
	河南中医药大学 **Henan University of Chinese Medicine**
	河南工程学院 **Henan University of Engineering**
	郑州师范学院 **Zhengzhou Normal University**
	黄河科技学院 **HUANGHE S&T UNIVERSITY**
	深圳职业信息技术学院 **Shenzhen Institute of Information Technology**

Technically Co-sponsored by	
NSFC National Natural Science Foundation of China	**The National Natural Science Foundation of China**
THE INTERNATIONAL NEURAL NETWORK SOCIETY (INNS)	**The International Neural Network Society**
International Partners	
LIVERPOOL JOHN MOORES UNIVERSITY	**Liverpool John Moores University, Liverpool, UK**
Kazan Federal UNIVERSITY	**Kazan Federal University, RUS**

The Location of Conference Venue

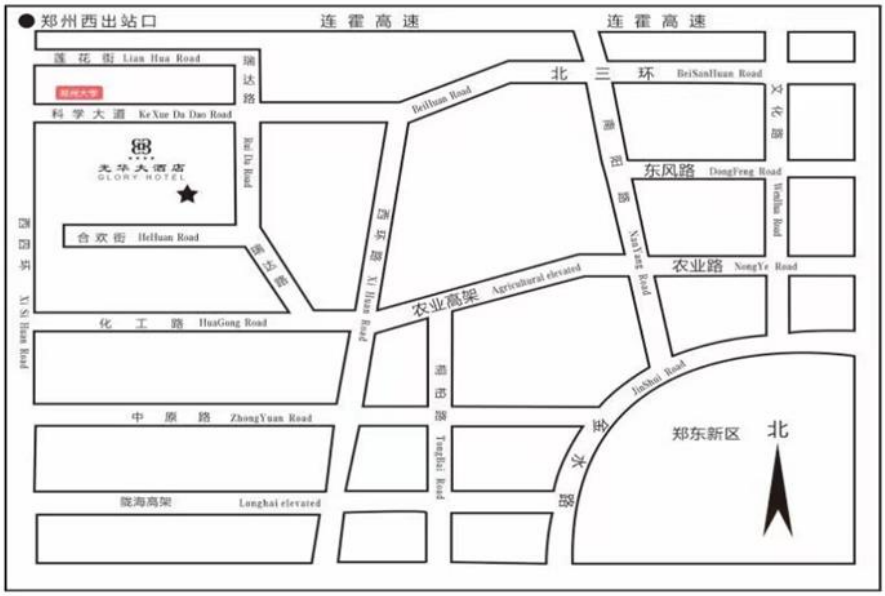
Conference Venue

ICIC 2023 Conference Venue is Glory Hotel (www.gloryhotel.cc), which is located in the center of Zhengzhou High-tech Industrial Development Zone, with a square in front of it, a park behind it, a large supermarket and a municipal hospital all around it. It is a well-known landmark building of the high-tech zone, the most prosperous economic and commercial center of the high-tech zone, and the largest transportation hub of the high-tech zone. The many lines of Bus Rapid Transits (BRT) are connected with major transportation hubs in the city. It is close to Metro Line 1, Zhengzhou Ring Expressway, Zhengshao Expressway and Lianhuo Expressway, so the transportation is very convenient. It is only an agricultural viaduct distance from Zhengdong New District. Advantageous geographical location, strong cultural atmosphere, beautiful environment, very suitable for the conference team to stay. The hotel is a four-star business hotel integrating accommodation, conference, fitness, leisure and entertainment.

It covers an area of 38000 square meters with a building area of 100,000 square meters. The hotel had reinstalled in April 2023. It has 318 executive, luxury, business and other rooms, which can provide accommodation for 550 people. Has the international standard of the conference center, the size of a total of 11 venues, can meet the needs of 30- 1000 people meeting reception; The hotel has 17 banquet rooms and 2 700-1000 square banquet halls, which can serve 1000 people at the same time. The best large-scale sports center has the most complete facilities and equipment in Henan Province. It has national standard swimming pool, indoor tennis hall, badminton hall, table tennis hall, a full set of Italy imported Technogym fitness equipment, to meet your sports needs. Has a large ground parking lot, ground parking space up to 500. The hotel is also the conference reception service unit for provincial, municipal and direct Party and government agencies for many years.

Location and Road Map

光华大酒店位置图



General Information

I. Conference Working Language

English is the official language of the conference.

II. Conference Registration

The ICIC 2023 registration desk, located in the lobby of Glory Hotel, Zhengzhou, the first floor, will be open during the following hour:

- August 10, 2023 (Thursday) 4:00pm-8:00pm
- August 11, 2023 (Friday) 8:30am-6:00pm

III. Conference Events

The ICIC 2023 events are scheduled as follows:

- Reception: 18:00-20:30 pm, August 10, 2023 (Friday): 1nd floor, European Garden Hall (一楼欧洲花园厅), Glory Hotel, Zhengzhou.
- Banquet: 19:00-21:00 pm, August 12, 2023 (Saturday): 1th floor, Golden Hall (一楼金色大厅), Glory Hotel, Zhengzhou.
- All the meals but Reception and Banquet: 1nd floor, European Garden Hall (一楼欧洲花园厅).

IV. Conference Rooms

- **Plenary Lecture**, Metagalaxy Hall, 3rd floor (三楼宇宙厅), Glory Hotel, Zhengzhou.
- **Room A**, Mercury Hall, 3rd floor (三楼水星厅), Glory Hotel, Zhengzhou.
- **Room B**, Jupiter Hall, 3rd floor (三楼木星厅), Glory Hotel, Zhengzhou.
- **Room C**, Moon Hall, 3rd floor (三楼月亮厅), Glory Hotel, Zhengzhou.
- **Room D**, Sun Hall, 3rd floor (三楼太阳厅), Glory Hotel, Zhengzhou.

V. Information for Oral Presenters

- Please prepare a 10-minute PowerPoint (PPT) slide. Your actual presentation time may depend on the number of presentations in your session.
- Please check this Final Program for your presentation time and room. Please go to the room five minutes before the session starts and report to the Session Chair.
- Please follow the instructions of the Session Chair(s) not to exceed your time allotted to you by them.
- If the Session Chair(s) is/are absent from the session, the last speaker is requested to serve as the Session Chair.

VI. Information for Session Chairs

The Organizing Committee would like to ask for your kind help as Session Chair (s). If you cannot fulfill your duties as session chair, please try to make sure that someone else will take your place as Session Chair(s).

As a Session Chair, you are kindly requested to help at the following:

- Arrive at the room of the session at least 5 minutes before the session starts and identify each of the speakers for the session.

- Calculate and announce the time allocated for each paper in your session for only the authors present before the session starts.
- The time allocated to a paper may be different in different sessions, due to uneven distribution of papers in different areas and a small number of absentees due to visa and other reasons. Request the presenters to leave 2 minutes for question and answers.
- Each oral presentation room is equipped with an LCD projector. If something is not working properly, please contact conference helper in the room.

Schedule Overview

<table>
<tr><th>Date</th><th>Morning</th><th>Afternoon</th><th>Evening</th></tr>
<tr><td>August 10
Thursday</td><td colspan="3">Registration (4:00 pm-8:00 pm)</td></tr>
<tr><td rowspan="6">August 11
Friday
(Metagalaxy Hall, 3rd floor)</td><td>Opening Ceremony Session
08:00-08:20 am</td><td>Lunch time: 12:00-13:30pm</td><td rowspan="6">Reception:
18:00-19:30 pm</td></tr>
<tr><td>Plenary Speaker I: C.L. Philip Chen
Chair: De-Shuang Huang
08:20-09:10 am</td><td>Plenary Speaker V: Fangxiang Wu
Chair: Guangwu Hu
14:00-14:50 pm</td></tr>
<tr><td>Plenary Speaker II: Yongduan Song
Chair: Jiaofen Nan
09:10-10:00 am</td><td>Plenary Speaker VI: Vasu Alagar
Chair: Yu Wang
14:50-15:40 pm</td></tr>
<tr><td>Coffee Break: 10:00-10:20 am</td><td>Coffee Break: 15:40-16:00 pm</td></tr>
<tr><td>Plenary Speaker III: Andrew E Teschendorff
Chair: De-Shuang Huang
10:20-11:10 am</td><td>Plenary Speaker VII: Tiantian Xu
Chair: Weiwei Zhang
16:00-16:50 pm</td></tr>
<tr><td>Plenary Speaker IV: Prashan Premaratne
Chair: Zhijuan Jia
11:10-12:00 am</td><td>Plenary Speaker VIII: Lefei Zhang
Chair: Kaili Shao
16:50-17:40 pm</td></tr>
<tr><td rowspan="3">August 12
Saturday</td><td>Oral Presentation
08:00-10:00am
Room A, Room B, Room C, Room D</td><td>Oral Presentation
14:00-15:00pm
Room A, Room B, Room C, Room D</td><td rowspan="3">Banquet
19:00-21:00 pm</td></tr>
<tr><td>Coffee Break: 10:00-10:10am</td><td>Coffee Break: 15:00-5:10pm</td></tr>
<tr><td>Oral Presentation
10:10-12:10am
Room A, Room B, Room C, Room D</td><td>Oral Presentation
15:10-18:10pm
Room A, Room B, Room C, Room D</td></tr>
<tr><td>August 13
Sunday</td><td colspan="3">Free Activity</td></tr>
</table>

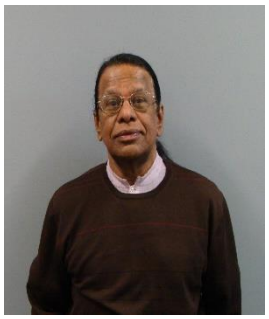
Introduction of Plenary Speakers

■ Plenary Speaker I: Vasu Alagar

Patient-Centered Treatment Based on Semantics of Similar Situations

Vasu Alagar, PhD, Professor Emeritus

Department of Computer Science and Software Engineering, Concordia University, Montreal, Canada H3G 1M8



Abstract: In patient-centered care the attending physician, in consultation with the patient, determines a personalized treatment plan for the patient. In order to avoid delay and expensive pre-diagnosis procedure, it is suggested that the knowledge of existing patient cohort be used for comparative effectiveness studies and better understanding of patient health situation. In this talk we define a health situation to include disease type, drugs administered, and set of reactions. By a similarity computation on health situations, it is possible to discover patient cohort for a given patient provided the similarity is based on correct semantics. We propose a formal generic structure of Electronic Health Record (HER) in which a situation can be formally represented. By formal we mean the situation characteristics are captured by different attributes and their data types in HER, thus a HER is the virtual patient having the health situation. We explain scoring functions for attribute pairs, defined on ontology-based semantic graphs, and how they are aggregated to compute similarity between situations. We have found several scoring functions. The experimental results demonstrate that they are all effective in ranking the patients in a cohort group. We believe that by leveraging drug similarity in combination with disease similarity, our method could support the treating team to remain more vigilant and prepared for any disease complication or detection of new symptoms at the earliest. It can lead them to take quick and confident decisions with better outcome.

Bio-Sketch: Vasu Alagar is an Emeritus Professor in the Department of Computer Science and Software Engineering at Concordia University, Montreal, Canada. His academic career, spawning over four decades, has been rich and varied that includes Algorithm Development and Complexity Analysis, Formal Methods, Language Semantics, and Rigorous Development of Large Complex Systems. His recent research centers around Formal Component-based Software Development, Context-aware Systems, and in particular the embedding of context in programming languages and Service-oriented Systems, and Big Data discovery and Analytic. He has written and edited several books and conference proceedings. He has graduated more than 150 masters and PhD students, and his research results are widely published in many journals and conferences.

■ Plenary Speaker II: C.L. Philip Chen

Fuzzy Broad Learning (Neuro) Systems (FBLS): Explainability and Analysis on the Tradeoff between Accuracy and Complexity

C.L. Philip Chen, FIEEE, FAAAS, FIAPR, MAE

Dean, School of Computer Science and Engineering, South China University and Technology

Abstract: The fuzzy broad learning system (FBLS) is a recently proposed neuro-fuzzy model that shares the similar structure of a broad learning system (BLS). It shows high accuracy in both classification and regression tasks and inherits the fast computational nature of a BLS. However, the ensemble of several fuzzy subsystems in an FBLS decreases the possibility of understanding the fuzzy model since the fuzzy rules from different fuzzy systems are difficult to combine together while keeping the consistence. To balance the model accuracy and complexity, this talk is to discuss a synthetically simplified FBLS with better interpretability, named compact FBLS (CFBLS), which can generate much fewer and more explainable fuzzy rules for understanding. In such a way, only one traditional Takagi–Sugeno–Kang fuzzy system is employed in the feature layer of a CFBLS, and the input universe of discourse is equally partitioned to obtain the fuzzy sets with proper linguistic labels accordingly. The random feature selection matrix and rule combination matrix are employed to reduce the total number of fuzzy rules and to avoid the "curse of dimensionality." The experiments on the popular datasets indicate that the CFBLS can generate a smaller set of comprehensible fuzzy rules and achieve much higher accuracy than some state-of-the-art neuro-fuzzy models. Moreover, the advantage of CFBLS is also verified in a real-world application.

Bio-sketch: C. L. Philip Chen is the Chair Professor and Dean of the College of Computer Science and Engineering, South China University of Technology. He is a Fellow of IEEE, AAAS, IAPR, CAA, and HKIE; a member of Academia Europaea (AE), and a member of European Academy of Sciences and Arts (EASA). He received IEEE Norbert Wiener Award in 2018 for his contribution in systems and cybernetics, and machine learnings, and IEEE Joseph G. Wohl Outstanding Career award, and Wu WenJun Outstanding Contribution award from Chinese AI Association, received two times best transactions paper award from IEEE Transactions on Neural Networks and Learning Systems for his papers in 2014 and 2018. He is a highly cited researcher by Clarivate Analytics from 2018-2022. His current research interests include cybernetics, systems, and computational intelligence. He was the Editor-in-Chief of the IEEE Transactions on Cybernetics, the Editor-in-Chief of the IEEE Transactions on Systems, Man, and Cybernetics: Systems, and the President of IEEE Systems, Man, and Cybernetics Society.

■ Plenary Speaker III: Prashan Premaratne

Human Computer Interaction Using Hand Gestures – Past, Present and Future

Prashan Premaratne, PhD & Senior Lecturer

Senior Member IEEE, Australian TEQSA Expert in Artificial Intelligence

School of Electrical, Computer & Telecommunications Engineering

University of Wollongong, New South Wales, Australia

Abstract: Today, with the advent of technology especially due to advances in artificial intelligence, voice recognition-based computer interactions are unprecedented. Due to the lightening advances in object detection with the emergence of YOLO algorithms, object detection is highly accurate and in realtime. Yet, hand gesture recognition hasn't received the same advancements due to many challenges it faced. One of the major challenges is the temporal information present in hand signs which are dynamic in nature. They convey a message few sentences in length. Despite the modern research is highly advanced in detecting objects in images using massive computing power, tracking a hand sign with its intricate details and interpreting a dynamic hand gesture has been an enormous challenge. Many researchers predict that RNN will be the future for recognising such temporal visual data, yet, the results are still in its infancy.

Bio-Sketch: Prashan was born in Sri Lanka in 1972 and was awarded an Australian government scholarship under John Crawford Scholarship Scheme (JCSS) to pursue undergraduate studies at the University of Melbourne, Australia in 1994. Since 2003, he has been an academic at the University of Wollongong, Australia and is currently a Senior Lecturer at the School of Electrical, Computer and Telecommunications Engineering. In 2005, he developed a computer vision-based system to control any computer interface which resulted in worldwide acclaim which was called 'The Wave Controller'. Dr. Premaratne is a Senior Member of IEEE and is the author of the book "Human Computer Interaction Using Hand Gestures" published by Springer International. Dr. Premaratne has been a founding member of the International Conference on Intelligent Computing (ICIC). He has been the program co-chair, tutorial chair, plenary speech chair and International Liaison Chair for the past 19 years and has received Outstanding Leadership Award for his contribution to ICIC in 2015. Dr. Premaratne has published over one hundred publications and is also a reviewer for major International Journals. He has been Guest Editor for many technological Journals over the years and was also an Assistant Editor of Springer Journal of Cognitive Science.

■ Plenary Speaker IV: Yongduan Song

Several Critical Issues in Neural Network (NN) Driven Control Design and Analysis

Yongduan Song, IEEE/AAIA/CAA Fellow, FIEAS, IEEE TNNLS Editor-in-Chief

Dean, Research Institute of Artificial Intelligence, Chongqing University.

Abstract: Neural networks and related learning algorithms are crucial components of artificial intelligence. The utilization of neural networks combined with learning algorithms for controller design has become a mainstream direction in the field of intelligent control. This talk will examine the typical NN driven design approaches and expose several critical issues related to functionality and effectiveness of the NN based control methods.

Bio-Sketch: Professor Yong-Duan Song is a Fellow of IEEE, Fellow of AAIA, Fellow of International Eurasian Academy of Sciences, and Fellow of Chinese Automation Association. He was one of the six Langley Distinguished Professors at National Institute of Aerospace (NIA), USA and register professional engineer (USA). He is currently the dean of Research Institute of Artificial Intelligence at Chongqing University. Professor Song is the Editor-in-Chief of IEEE Transactions on Neural Networks and Learning Systems (TNNLS) and the founding Editor-in-Chief of the International Journal of Automation and Intelligence.

■ Plenary Speaker V: Andrew E Teschendorff

Using Network Physics to Improve Analysis and Interpretation of Single-Cell Omic Data

Andrew E Teschendorff, PhD & Professor
Head of Computational Systems Epigenomics, CAS Key-Lab of Computational Biology, Shanghai Institute for Nutrition and Health, Chinese Academy of Sciences, and Honorary Research Fellow University College London

Abstract: Graph-theory and network physics are branches of complexity science that have found ubiquitous successful applications in science generally. This talk will describe a number of concrete examples where network-theoretical concepts have entered the relatively young field of single-cell genomics, driving important breakthroughs and discoveries. One example shows how the differentiation state of single cells can be successfully modelled in terms of the diffusion network entropy of a stochastic signaling process in the cell. The talk will further describe how this concept has led to the identification of cancer-stem-cells, the presumed cells of origin of tumors, opening up new strategies for personalized and preventive medicine. Another example explores the use of node-attribute-aware clustering algorithms to detect differential abundance of cell-types in relation to aging and disease. I will demonstrate how cell-attribute aware clustering of single-cell data can improve the sensitivity to detect important shifts in cell-type abundance, including increased stem-cell fractions in colonic polyps or loss of olfactory sensory neurons in Covid-19 patients experiencing long-term smell loss.

Bio-sketch: Andrew Teschendorff studied Mathematical Physics at the University of Edinburgh (1990-1995) under the supervision of Physics Nobel Laureate Peter Higgs. In 2000 he obtained a PhD in Theoretical Physics from Cambridge University. In 2003 he became a Senior Research Fellow in Statistical Cancer Genomics at the University of Cambridge. In 2008 he moved to University College London (UCL) to work in Statistical Cancer Epigenomics and where he was awarded the Heller Research Fellowship. He currently holds an appointment as a PI at the CAS Key Lab of Computational Biology in Shanghai, formerly a joint CAS-Max-Planck Partner Institute for Computational Biology, and remains an Honorary Research Fellow at University College London. His research interests are broad and include Cancer System-omics & Systems Biology and Network Physics. He is well-known for developing pioneering statistical methods for analyzing various forms of genomic data, notably epigenomics and single-cell data. Professor A. Teschendorff has a Google H-index of 77, more than 150 peer-reviewed publications, including 8 book-chapters. He is an Associate Editor for many journals, including notably Genome Biology, and a reviewer and statistical advisor for journals that include Nature, Science, Bioinformatics, PLoS Computational Biology and IEEE Transactions on Computational Biology & Bioinformatics. He is a recipient of the Wolfson College Jennings Prize, Cambridge-MIT Initiative and Isaac Newton Trust Awards, a Wellcome Trust VIP Award, a CAS Visiting Professorship and a CAS-Royal Society Newton Advanced Fellowship. He holds various patents on algorithms for cancer risk prediction and cell-type deconvolution.

■ Plenary Speaker VI: FangXiang Wu

Intelligent Computing: from Matrix Factorization to Deep Network, for Biomarker Discovery

FangXiang Wu, PhD & Professor

Departments of Computer Science, Biomedical Engineering, and Mechanical Engineering, the University of Saskatchewan.

Abstract: Intelligent computing refers to the field of computer science and technology that focuses on developing computational systems and algorithms to perform tasks that typically require human intelligence. As one of intelligent computing subfields, machine learning focuses on designing and training computer algorithms to learn from and act on data. A biomarker is a measurable indicator of some biological state or condition, including molecular biomarkers, cellular biomarkers, or digital biomarkers. In this talk, after an introduction to machine learning formulation, I will present some of research work from my group in the areas of intelligent computing, from matrix factorization to deep network, for molecular biomarker discovery.

Bio-sketch: Dr FangXiang Wu is currently a full professor in the Departments of Computer Science,Biomedical Engineering, and Mechanical Engineering at the University of Saskatchewan. His research interests include Artificial Intelligence,Machine, Deep Learning,Computational Biology, Health Informatics, Medical Image Analytics,and Complex Network Analytics. Dr. Wu has published about 350 journal papers and more than 130 conference papers.?His total google scholar citations are over 13000, h-index is 55 (dated in early June, 2023). He is among top 2% world's scientists ranked by Stanford University. Dr Wu is serving as the editorial board member of several international journals (including IEEE TCBB, Neurocomputing, etc.) and as the guest editor of numerous international journals, and as the program committee chair or member of many international conferences. He is an IEEE senior member.

■ Plenary Speaker VII: Tiantian Xu

Motion Control of Magnetically Actuated Microrobots Towards Targeted Therapy

Tiantian Xu, PhD & Professor

Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, Shenzhen, China.

Abstract: Untethered, wirelessly controlled microrobots have a broad application prospects for the bioengineering due to their small scales. Multiple small-scale robots enable cooperation and increase the operating efficiency. However, independent control of multiple magnetic small-scale robots is a great challenge, because the robots receive identical control inputs from the same external magnetic field. We propose a novel strategy of completely decoupled independent control of magnetically actuated flexible swimming millirobots. The strategy is verified by experiments of independent position control of up to four millirobots and independent path following control of up to three millirobots with small errors. Then, we propose an adaptive leader-follower formation control of two magnetically actuated millirobots with heterogeneous magnetization and achieved an autonomous navigation in confined environments.

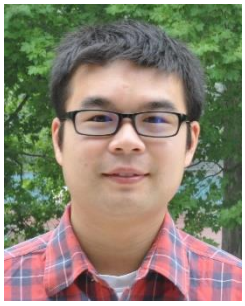
Bio-sketch: Tiantian Xu is currently Professor in Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences. She received the Ph.D. degree at University of Pierre and Marie Curie, Paris, France. Her research interests are currently focused on magnetic microrobots, soft robots, medical robots, and etc. She has published over 20 IEEE Transactions papers, including TRO, T-cyber, TMECH, TASE, 6 of them are ESI high cited papers. She has received the NSFC excellent young scholar in 2020, the best application paper award in IROS2019, and the Second Prize of Wu Wenjun Natural Science of Artificial Intelligence in 2021 as first author, CAA Young Scientist. She is associate editor for TRO, TASE and RAL.

■ Plenary Speaker VIII: Lefei Zhang

AI Innovation for Big Vision Data

Lefei Zhang, PhD & Professor

School of Computer Science, Wuhan University, Wuhan, China.



Abstract: Artificial intelligence (AI) plays a growing role in all traditional areas. In this talk, we will introduce our recently developed AI techniques for computer vision data processing tasks, including image super-resolution, inpainting, semantic segmentation, and object detection. From these successful examples, we observe that the carefully designed AI algorithms and networks are usually inspired by human experiences of solving problems in practice. Furthermore, benefit from the strong support of the computational resources and big data, AI algorithms could reach even exciting performance. However, there are also critical concerns exist. In the future work, we will study how to run the AI models with extremely limited human expert labeled data, to serve for more challenging tasks such as autonomous driving and medical data analysis.q

Bio-sketch: Lefei Zhang received the B.S. and Ph.D. degrees from Wuhan University, Wuhan, China, in 2008 and 2013, respectively. He was a Big Data Institute Visitor with the Department of Statistical Science, University College London, U.K., and a Hong Kong Scholar with the Department of Computing, The Hong Kong Polytechnic University, Hong Kong, China. He is a professor with the School of Computer Science, Wuhan University, Wuhan, China, and also with the Hubei Luojia Laboratory, Wuhan, China. His research interests include pattern recognition, image processing, and remote sensing. Dr. Zhang serves as a topical editor of IEEE Transactions on Geoscience and Remote Sensing, an associate editor of Pattern Recognition, and a section editor-in-chief of Remote Sensing.

Parallel Sessions for Oral Presentations

Time \ Room	Room A	Room B	Room C	Room D
Morning Aug. 12 8:00-10:00	Intelligent Optimization Algorithms **Chair:** Ben Niu	Intelligent Computing in Computer Vision **Chair:** Guangwu Hu	Machine Learning **Chair:** Zheng Chen	Neural Networks **Chair:** Mengqi Wu
Morning Aug. 12 10:10-12:10	Intelligent Optimization Algorithms **Chair:** Jiangpo Wei	Image Processing **Chair:** Prashan Premaratne	Machine Learning **Chair:** Shaoming Ji	Reinforcement Learning **Chair:** Qingqing Wang
Afternoon Aug. 12 13:30-15:30	Intelligent Data Analysis and Prediction **Chair:** Siyu Peng	Signal Processing **Chair:** Abir Hussain	Intelligent Computing in Computational Biology **Chair:** Yingjie Long	Medical Image Analysis **Chair:** Meng Zhang
Afternoon Aug. 12 15:40-17:40	Knowledge Discovery and Data Mining **Chair:** Chee Kiat Seow	Natural Language Processing and Computational Linguistics **Chair:** Qingqing Li	Biomedical Informatics Theory and Methods **Chair:** Yue Gao	Intelligent Computing in Drug Design **Chair:** Yijia Zhang

Detailed Parallel Sessions for Oral Presentations

Morning, August 12, Saturday, Room A

Intelligent Optimization Algorithms

Chair: Ben Niu

Paper 601 **08:00-08:12**	**Real-time Crowdsourced Delivery Optimization Considering Maximum Detour Distance** *Xianlin Feng, Rong Hu, Naikang Yu, Bin Qian, and Changsheng Zhang*
Paper 654 **08:12-08:24**	**Improving SHADE with a Linear Reduction P Value and a Random Jumping Strategy** *Yanyun Zhang, Guangyu Chen, and Li Cheng*
Paper 508 **08:24-08:36**	**A Region Convergence Analysis for Multi-mode Stochastic Optimization Based on Double-well Function** *Guosong Yang, Peng Wang, and Xinyu Yin*
Paper 732 **08:36-08:48**	**A Branch and Bound Algorithm for The Two-Machine Blocking Flowshop Group Scheduling Problem** *Sen Zhang, Bin Qian, Rong Hu, Changsheng Zhang, and Kun Li*
Paper 556 **08:48-09:00**	**Hyper-Heuristic Ant Colony Optimization Algorithm for Multi-objective Two-echelon Vehicle Routing Problem with Time Windows** *Qiuyi Shen, Ning Guo, Rong Hu, Bin Qian, and Jianlin Mao*
Paper 598 **09:00-09:12**	**Learning Variable Neighborhood Search Algorithm for Solving the Energy Efficient Flexible Job-shop Scheduling Problem** *Ying Li, Rong Hu, Xing Wu, Bin Qian, and Ziqi Zhang*
Paper 561 **09:12-09:24**	**Hyper-Heuristic Estimation of Distribution Algorithm for Green Hybrid Flow-shop Scheduling and Transportation Integrated Optimization Problem** *Ling Bai, Bin Qian, Rong Hu, Zuocheng Li, and Huaiping Jin*
Paper 586 **09:24-09:36**	**Learning Based Memetic Algorithm for the Monocrystalline Silicon Production Scheduling Problem** *Jianqun Gong, Zuocheng Li, Bin Qian, Rong Hu, and Bin Wang*
Paper 185 **09:36-09:48**	**Hybrid hyper-heuristic algorithm for integrated production and transportation scheduling problem in distributed permutation flow shop** *Wenbo Chen, Bin Qian, Rong Hu, Sen Zhang, and Yijun Wang*
Paper 673 **09:48-10:00**	**Q-learning Based Particle Swarm Optimization with Multi-exemplar and Elite Learning** *Haiyun Qiu, Bowen Xue, Qinge Xiao, and Ben Niu*

Morning, August 12, Saturday, Room B

Intelligent Computing in Computer Vision

Chair: Guangwu Hu

Paper 296 **08:00-08:12**	**Brain Tumor Image Segmentation Network Based on Dual Attention Mechanism** *Fuyun He, Yao Zhang, Yan Wei, Youwei Qian, Cong Hu, and Xiaohu Tang*
Paper 684 **08:12-08:24**	**An Unsupervised Video Summarization Method Based on Multimodal Representation** *Zhuo Lei, Qiang Yu, Lidan Shou, Shengquan Li, and Yunqing Mao*
Paper 771 **08:24-08:36**	**UCLD-Net: Decoupling Network via Unsupervised Contrastive Learning for Image Dehazing** *Zhitao Liu, Tao Hong, and Jinwen Ma*
Paper 857 **08:36-08:48**	**A Driver Abnormal Behavior Detection Method Based on Improved YOLOv7 and OpenPose** *Xingquan Cai, Shun Zhou, Jiali Yao, Pengyan Cheng, and Yan Hu*
Paper 737 **08:48-09:00**	**InterFormer: Human Interaction Understanding with Deformed Transformer** *Di He, Zexing Du,Xue Wang, and Qing Wang*
Paper 502 **09:00-09:12**	**One-Dimensional Feature Supervision Network for Object Detection** *Longchao Shen,Yongsheng Dong,Yuanhua Pei,Haotian Yang,Lintao Zheng,and Jinwen Ma*
Paper 754 **09:12-09:24**	**Corneal ulcer automatic classification network based on improved Mobile ViT** *Chenlin Zhu, Wenyan Wang, Kun Lu, Jun Zhang, Peng Chen, Lejun Pan, Jiawei Ni, and Bing Wang*
Paper 273 **09:24-09:36**	**Siamese Adaptive template update Network for Visual Tracking** *Jia Wen, Kejun Ren, Yang Xiang, and Dandan Tang*
Paper 156 **09:36-09:48**	**Multi-Scale and Self-Mutual Feature Distillation** *Nianzu Qiao, Jia Sun, and Lu Dong*
Paper 624 **09:48-10:00**	**Use the Detection Transformer as a Data Augmenter** *Luping Wang and Bin Liu*
Morning, August 12, Saturday, Room C	
Machine Learning	
Chair: Zheng Chen	
Paper 912 **08:00-08:12**	**A no parameter synthetic minority oversampling technique based on Finch for imbalanced data** *Shoukun Xu, Zhibang Li, Baohua Yuan, Gaochao Yang, Xueyuan Wang, and Ning Li*
Paper 128 **08:12-08:24**	**K-means Based Transfer Learning Algorithm** *Yuanyuan Du, Bo Li, and Zhonghua Quan*
Paper 924 **08:24-08:36**	**Automatic Model Selection Algorithm Based on BYY Harmony Learning for Mixture of Gaussian Process Functional Regressions Models** *Xiangyang Guo, Tao Hong, and Jinwen Ma*

Paper 817 **08:36-08:48**	**TDRConv: Exploring the Trade-off Between Feature Diversity and Redundancy for a Compact CNN Module** *Haigen Hu, Deming Zhou, Hui Xu, Qi Chen, Qiu Guan, and Qianwei Zhou*
Paper 971 **08:48-09:00**	**GNAT: Leveraging Weighted Negative Sampling for Improved Graph Attention Network Performance** *Yujin Lu, Qi Wang, Wanyi Zhou, and Jeffrey Zheng*
Paper 504 **09:00-09:12**	**Zero-Shot Learning Based on Weighted Reconstruction of Hybrid Attribute Groups** *Jiarui Zhang, Ruilin Li, Nannan Yu, Jian Liu, and Yi Kong*
Paper 867 **09:12-09:24**	**Community Detection Using Revised Medoid-Shift Based on KNN** *Jiakang Li, Xiaokang Peng, Jie Hou, Wei Ke, and Yonggang Lu*
Paper 663 **09:24-09:36**	**Instance Weighting-based Noise Correction for Crowdsourcing** *Qiang Ji, Liangxiao Jiang, and Wenjun Zhang*
Paper 134 **09:36-09:48**	**2D-DLPP Algorithm Based on SPD Manifold Tangent Space** *Xiaohang Li, Bo Li, and Zonghui Wang*
Paper 915 **09:48-10:00**	**Terminology-Enriched Meta-Curriculum Learning for Domain Neural Machine Translation** *Zheng Chen and Yifan Wang*

Morning, August 12, Saturday, Room D

Neural Networks

Chair: Mengqi Wu

Paper 631 **08:00-08:12**	**Solving Class Imbalance Problem in Target Detection with a Squared Cross Entropy Based Method** *Guanyu Chen, Quanyu Wang, Qi Li, Jun Hu, and Jingyi Liu*
Paper 886 **08:12-08:24**	**Speech Emotion Recognition Using Global-Aware Cross-Modal Feature Fusion Network** *Feng Li and Jiusong Luo*
Paper 118 **08:24-08:36**	**Adversarial Ensemble Training by Jointly Learning Label Dependencies and Member Models** *Lele Wang and Bin Liu*
Paper 119 **08:36-08:48**	**PFGE: Parsimonious Fast Geometric Ensembling of DNNs** *Hao Guo, Jiyong Jin, and Bin Liu*
Paper 686 **08:48-09:00**	**A Multi-granularity Decision Fusion Method Based on Category Hierarchy** *Jian-Xun Mi, Ke-Yang Huang, and Nuo Li*
Paper 650 **09:00-09:12**	**Modeling Working Memory using Convolutional Neural Networks for Knowledge Tracing** *Huali Yang, Bin Chen, Junjie Hu, Tao Huang, Jing Geng, and Linxia Tang*

Paper 527 **09:12-09:24**	**Solving Large-Scale Open Shop Scheduling Problem via Link Prediction Based on Graph Convolution Network** *Lanjun Wan, Haoxin Zhao, Xueyan Cui, Changyun Li, and Xiaojun Deng*
Paper 818 **09:24-09:36**	**Make Active Attention More Active: Using Lipschitz Regularity to Improve Long Sequence Time-Series Forecasting** *Xiangxu Meng, Wei Li, Wenqi Zheng, Zheng Zhao, Guangsheng Feng, and Huiqiang Wang*
Paper 883 **09:36-09:48**	**CharCaps: Character-level Text Classification using Capsule Networks** *Yujia Wu, Xin Guo, and Kangning Zhan*
Paper 872 **09:48-10:00**	**Attributed Multi-Relational Graph Embedding Based on GCN** *Zhuo Xie, Mengqi Wu, Guoping Zhao, Lijuan Zhou, Zhaohui Gong, and Zhihong Zhang*
Morning, August 12, Saturday, Room A	
Intelligent Optimization Algorithms	
Chair: Jiangpo Wei	
Paper 799 **10:10-10:22**	**Runtime Analysis of Estimation of Distribution Algorithms for a Simple Scheduling Problem** *Rui Liu, Bin Qian, Sen Zhang, Rong Hu, and Nai-Kang Yu*
Paper 485 **10:22-10:34**	**Probability Learning Based Multi-Objective Evolutionary Algorithm for Distributed No-Wait Flow-Shop and Vehicle Transportation Integrated Optimization Problem** *Ziqi Ding, Zuocheng Li, Bin Qian, Rong Hu, and Changsheng Zhang*
Paper 846 **10:34-10:46**	**Hyper-Heuristic Three-Dimensional Estimation of Distribution Algorithm for Distributed Assembly Permutation Flowshop Scheduling Problem** *Xiao Li, Zi-Qi Zhang, Rong Hu, Bin Qian, and Kun Li*
Paper 658 **10:46-10:58**	**A Learning-based Multi-objective Evolutionary Algorithm for Parallel Machine Production and Transportation Integrated Optimization Problem** *Shurui Zhang, Bin Qian, Zuocheng Li, Rong Hu, and Biao Yang*
Paper 575 **10:58-11:10**	**Improved EDA-based Hyper-heuristic for Flexible Job Shop Scheduling Problem with Sequence-Independent Setup Times and Resource Constraints** *Xinghan Qiu, Bin Qian, Ziqi Zhang, Zuocheng Li, and Ning Guo*
Paper 608 **11:10-11:22**	**A Q-learning-based Hyper-heuristic Evolutionary Algorithm for the Distributed Flexible Job-shop Scheduling Problem** *Fangchun Wu, Bin Qian, Rong Hu, Ziqi Zhang, and Bin Wang*
Paper 844 **11:22-11:34**	**Sparrow Search Algorithm Based on Cubic Mapping and Its Application** *Shuo Zheng, Feng Zou, and DeBao Chen*
Paper 842 **11:34-11:46**	**Nonlinear Inertia Weight Whale Optimization Algorithm with Multi-Strategy and its Application** *Congsong Li, Feng Zou, and Debao Chen*
Paper 510 **11:46-11:58**	**A Quantum Simulation Method with Repeatable Steady-State Output Using Massive Inferior Solutions** *Guosong Yang, Peng Wang, Gang Xin, and Xinyu Yin*

Paper 985 **11:58-12:10**	**Particle Swarm Optimization with Genetic Evolution for Task Offloading in Device-Edge-Cloud Collaborative Computing** *Bo Wang and Jiangpo Wei*

Morning, August 12, Saturday, Room B

Image Processing

Chair: Prashan Premaratne

Paper 752 **10:10-10:22**	**Efficient and Precise Detection of Surface Defects on PCBs: A YOLO Based Approach** *Lejun Pan, Wenyan Wang, Kun Lu, and Jun Zhang*
Paper 768 **10:22-10:34**	**Multiple classification network of concrete defects based on improved EfficientNetV2** *Jiawei Ni, Bing Wang, Kun Lu, Jun Zhang, Peng Chen, Lejun Pan, Chenlin Zhu, Bing Wang, and Wenyan Wang*
Paper 913 **10:34-10:46**	**A weakly supervised semantic segmentation method on lung adenocarcinoma histopathology images** *Xiaobin Lan, Jiaming Mei, Ruohan Lin, Jiahao Chen, and Yanju Zhang*
Paper 849 **10:46-10:58**	**A Lightweight Hyperspectral Image Super-Resolution Method Based on Multiple Attention Mechanisms** *Lijing Bu, Dong Dai, Zhengpeng Zhang, Xinyu Xie, and Mingjun Deng*
Paper 870 **10:58-11:10**	**Graph Disentangled Representation based Semi-supervised Single Image Dehazing Network** *Tongyao Jia, Jiafeng Li, and Li Zhuo*
Paper 205 **11:10-11:22**	**A method for detecting and correcting specular highlights in capsule endoscope images based on independent cluster distribution** *Jiarui Ma and Yangqing Hou*
Paper 303 **11:22-11:34**	**Text-Guided Generative Adversarial Network for Image Emotion Transfer** *Siqi Zhu , Chunmei Qing, and Xiangmin Xu*
Paper 424 **11:34-11:46**	**SporeDet: A Real-time Detection of Wheat Scab Spores** *Jin Yuan, Zhangjin Huang, Dongyan Zhang, Xue Yang, and Chunyan Gu*
Paper 623 **11:46-11:58**	**Food Image Classification Based on Residual Network** *Xueyan Yang, Jinping Sun, Zhuo Wang, and Wenzheng Bao*
Paper 374 **11:58-12:10**	**What Constitute an Effective Edge Detection Algorithm?** *Prashan Premaratne and Peter Vial*

Morning, August 12, Saturday, Room C

Machine Learning

Chair: Shaoming Ji

Paper 130 **10:10-10:22**	**HSIC Induced LncRNA Feature Selection** *Anjie Guo and Bo Li*
Paper 645 **10:22-10:34**	**BYOL Network Based Contrastive Clustering** *Xuehao Chen, Weidong Zhou, Jin Zhou, Yingxu Wang, Shiyuan Han, Tao Du, Cheng Yang, and Bowen Liu*
Paper 659 **10:34-10:46**	**Deep Multi-view Clustering based on Graph Embedding** *Chen Zhang, Weidong Zhou, Jin Zhou, Yingxu Wang, Shiyuan Han, Tao Du, Cheng Yang, and Bowen Liu*
Paper 661 **10:46-10:58**	**Graph-based short text clustering via contrastive learning with graph embedding** *Yujie Wei, Weidong Zhou, Jin Zhou, Yingxu Wang, Shiyuan Han, Tao Du, Cheng Yang, and Bowen Liu*
Paper 121 **10:58-11:10**	**Adaptive Probabilistic Broadcast in Ad hoc Networks** *Xiaoying Shuai, Yuxia Yin, and Bin Zhang*
Paper 216 **11:10-11:22**	**Aggregation of S-generalized distances** *Lijun Sun,Chen Zhao, and Gang Li*
Paper 758 **11:22-11:34**	**A Survey on Multimodal Named Entity Recognition** *Shenyi Qian, Wenduo Jin, Yonggang Chen, Jiangtao Ma, Yaqiong Qiao, and Jinyu Lu*
Paper 628 **11:34-11:46**	**Automatic Text Extractive Summarization Based on Text Graph Representation and Attention Matrix** *Yuan-Ching Lin and Jinwen Ma*
Paper 678 **11:46-11:58**	**Speaker-Aware Dialogue Discourse Parsing with Meta-Path Based Heterogeneous Graph Neural Network** *Shaoming Ji and Fang Kong*

Morning, August 12, Saturday, Room D

Reinforcement Learning

Chair: Qingqing Wang

Paper 472 **10:10-10:22**	**Deep Reinforcement Learning for Solving Multi-objective Vehicle Routing Problem** *Jian Zhang, Rong Hu, Yi-Jun Wang, Yuan-Yuan Yang, and Bin Qian*
Paper 976 **10:22-10:34**	**A Reinforcement Learning Method for Solving the Production Scheduling Problem of Silicon Electrodes** *Yu-Fang Huang, Rong Hu, Xing Wu, Bin Qian, and Yuan-Yuan Yang*
Paper 657 **10:34-10:46**	**Improved Particle Swarm Optimization Algorithm Combined with Reinforcement Learning for Solving Flexible Job Shop Scheduling Problem** *Yijie Gao, Qingxia Shang, Yuanyuan Yang, Rong Hu, and Bin Qian*
Paper 741 **10:46-10:58**	**Deep Reinforcement Learning for Solving Distributed Permutation Flow Shop Scheduling Problem** *Yijun Wang, Bin Qian, Rong Hu, Yuanyuan Yang, and Wenbo Chen*

Paper 896 **10:58-11:10**	**Reinforcement-Learning based Preload Strategy for Short Video** *Zhicheng Ren, Yongxin Shan, Wanchun Jiang,Yijing Shan, Danfeng Shan, and Jianxin Wang*
Paper 986 **11:10-11:22**	**Advancing Air Combat Tactics with Improved Neural Fictitious Self-Play Reinforcement Learning** *Shaoqin He, Yang Gao, Baofeng Zhang, Hui Chang, and Xinchen Zhang*
Paper 319 **11:22-11:34**	**On Context Distribution Shift in Task Representation Learning for Online Meta RL** *Chenyang Zhao, Zihao Zhou, and Bin Liu*
Paper 419 **11:34-11:46**	**A Hyper-Heuristic Algorithm with Q-Learning for Distributed Permutation Flowshop Scheduling Problem** *Ke Lan, Zi-Qi Zhang, Bi Qian, Rong Hu, and Da-Cheng Zhang*
Paper 560 **11:46-11:58**	**Hyper-Heuristic Q-Learning Algorithm for Flow-Shop Scheduling Problem with Fuzzy Processing Times** *Jinhan Zhu, Rong Hu, Zuocheng Li, Bin Qian, and Ziqi Zhang*
Paper 214 **11:58-12:10**	**Robust Anti-forensics on Audio Forensics System** *Qingqing Wang and Dengpan Ye*
Afternoon, August 12, Saturday, Room A	
Intelligent Data Analysis and Prediction	
Chair: Siyu Peng	
Paper 889 **13:30-13:42**	**A Light-weighted Model of GRU+CNN Hybrid for Network Intrusion Detection** *Dong Yang, Can Zhou, and Songjie Wei*
Paper 367 **13:42-13:54**	**CWA-LSTM: A Stock Price Prediction Model Based on Causal Weight Adjustment** *Qihang Zhang,Zhaoguo Liu,Zhuoer Wen,Da Huang, and Weixia Xu*
Paper 369 **13:54-14:06**	**StPrformer: A Stock Price Prediction Model Based on Convolutional Attention Mechanism** *Zhaoguo Liu, Qihang Zhang, Da Huang, and Dan Wu*
Paper 151 **14:06-14:18**	**A Hybrid Tourism Recommendation System Based on Multi-Objective Evolutionary algorithm and Re-ranking** *Ruifen Cao, Zijue Li, Pijing Wei,Ye Tian, and Chunhou Zheng*
Paper 339 **14:18-14:30**	**Time Series Prediction of 5G Network Data Based on Improved EEMDBiLSTM Prediction Model** *Jianrong Li, Zheng Li, Jie Li, Gongcheng Shi, Chuanlei Zhang, and Hui Ma*
Paper 196 **14:30-14:42**	**Intelligence Evaluation of Music Composition Based on Music Knowledge** *Shuo Wang, Yun Tie, Xiaobing Li, Xiaoqi Wang, and Lin Qi*
Paper 809 **14:42-14:54**	**Detformer: Detect the Reliable Attention Index for Ultra-long Time Series Forecasting** *Xiangxu Meng, Wei Li, Zheng Zhao, Zhihan Liu, Guangsheng Feng, and Huiqiang Wang*

Paper 966 **14:54-15:06**	**A dynamic graph convolutional network for anti-money laundering** *Tianpeng Wei, Biyang Zeng, Wenqi Guo, Zhenyu Guo, Shikui Tu, and Lei Xu*
Paper 317 **15:06-15:18**	**Design and Application of Mapping Model for Font Recommendation System Based on Contents Emotion Analysis** *Young Seo Jia and Soon bum Lim*
Paper 588 **15:18-15:30**	**Diagnosis of lung cancer subtypes by combining Multi-graph Embedding and Graph Fusion network** *Siyu Peng, Jiawei Luo, Cong Shen, and Bo Wang*

Afternoon, August 12, Saturday, Room B

Signal Processing

Chair: Abir Hussain

Paper 333 **13:30-13:42**	**Epileptic Seizure Detection based on feature extraction and CNN-BiGRU network with attention mechanism** *Jie Xu, Juan Wang, Jin-Xing Liu, Junliang Shang, Lingyun Dai, Kuiting Yan, and Shasha Yuan*
Paper 904 **13:42-13:54**	**Improving the Accuracy of Deep Learning Modelling Based on the Statistical Calculation of Mathematical Equations** *Feng Li and Yujun Hu*
Paper 280 **13:54-14:06**	**Improved DetNet Algorithm based on GRU for Massive MIMO systems** *Hanqing Ding , Bingwei Li, and Jin Xu*
Paper 596 **14:06-14:18**	**Metal Oxide Classification Based On SVM** *Kai Xiao, Zhuo Wang, and Wenzheng Bao*
Paper 865 **14:18-14:30**	**Collaborative Face Privacy Protection Method Based on Adversarial Examples in Social Networks** *Zhenxiong Pan, Junmei Sun, Xiumei Li, Xin Zhang, and Huang Bai*
Paper 271 **14:30-14:42**	**A Current Prediction Model Based on LSTM and Ensemble Learning for Remote Palpation** *Fuyang Wei, Jianhui Zhao, and Zhiyong Yuan*
Paper 668 **14:42-14:54**	**Minimizing peak memory footprint of inference on IoTs devices by efficient recomputation** *Xiaofeng Sun, Chaonong Xu, and Chao Li*
Paper 288 **14:54-15:06**	**DBCS-SMJF: Designing a BLDCM Control System for Small Machine Joints Using FOC** *Leyi Zhang, Yingjie Long, Yingbiao Hu, and Huinian Li*
Paper 989 **15:06-15:18**	**Exploiting Active-IRS by Maximizing Throughput in Wireless Powered Communication Networks** *Iqra Hameed and Insoo Koo*
Paper 874 **15:18-15:30**	**Electrocardiogram Signal Noise Reduction Application Employing Different Adaptive Filtering Algorithms** *Amine Essa, Abdullah Zaidan, Suhaib Ziad, Mohamed Elmeligy, Sam Ansari, Haya Alaskar, Soliman Mahmoud, Ayad Turky, Wasiq Khan, Dhiya Al-Jumeily OBE, and Abir Hussain*

Afternoon, August 12, Saturday, Room C	
Intelligent Computing in Computational Biology	
Chair: Yingjie Long	
Paper 132 **13:30-13:42**	**Molecular Identification Using Deep Learning Method** *Mingxiang Gao and Bo Li*
Paper 710 **13:42-13:54**	**SpliceSCANNER: an accurate and interpretable deep learning-based method for splice site prediction** *Rongxing Wang , Junwei Xu , Xiaodi Huang , Wangjing Qi , and Yanju Zhang*
Paper 707 **13:54-14:06**	**DeepMAT: Predicting Metabolic Pathways of Compounds using a Message Passing and Attention-Based Neural Networks** *Hayat Ali Shah, Juan Liu , Zhihui Yang, and Jing Feng*
Paper 969 **14:06-14:18**	**An Improved Variational Autoencoder-Based Clustering Method for PanCancer Diagnosis and Subtyping** *Binhua Tang and Jiafei Nie*
Paper 992 **14:18-14:30**	**A Stacking-based Ensemble Learning Predictor Combined with Particle Swarm Optimizer for Identifying RNA Pseudouridine Sites** *Xiao Wang, Pengfei Li, Lijun Han, and Rong Wang*
Paper 555 **14:30-14:42**	**Prediction of circRNA-binding protein site based on hybrid neural networks and recurrent forests method** *Zewen Wang, Qingfang Meng, Qiang Zhang, and Jiahao Zhang*
Paper 499 **14:42-14:54**	**TAPE-Pero: Using deep representation learning model to identify and localize peroxisomal proteins** *Jianan Sui, Yuehui Chen, Yi Cao, and Yaou Zhao*
Paper 863 **14:54-15:06**	**Plant vacuole protein classification with ensemble stacking model** *Xunguang Ju, Kai Xiao, Luying He, Qi Wang, Zhuo Wang, and Wenzheng Bao*
Paper 523 **15:06-15:18**	**Prediction of LncRNA-Protein Interactions based on Multi-Kernel Fusion and Graph Auto-Encoders** *Dongdong Mao, Cong Shen, Ruilin Wu, Yuyang Han, Yankai Wu, Jinxuan Wang, Jijun Tang, and Zhijun Liao*
Paper 704 **15:18-15:30**	**LXLMEPS: Leveraging the XGB-LCE-based Model for Early Prediction of Sepsis** *Leyi Zhang, Yingjie Long, Yingbiao Hu, and Huinian Li*
Afternoon, August 12, Saturday, Room D	
Medical Image Analysis	
Chair: Meng Zhang	
Paper 529 **13:30-13:42**	**DETA-Net: A Dual Encoder Network with Text-Guided Attention Mechanism for Skin-lesions Segmentation**

	Cong Shen, and Xinyue Wang Jijun Tang, and Zhijun Liao
Paper 1017 **13:42-13:54**	**A Blockchain-based Network Alignment System for Power Equipment Data Inconsistency** *Yuxiang Cai, Xin Jiang, Qifan Yang, Wenhao Zhao, and Chen Lin*
Paper 274 **13:54-14:06**	**Hessian Non-Negative Hypergraph** *Lingling Li, Zihang Li, Mingkai Wang, Taisong Jin, and Jie Liu*
Paper 496 **14:06-14:18**	**Multi-Omics Cancer Subtype Recognition Based on Multi-Kernel Partition Aligned Subspace Clustering** *Jian Liu, Long Hou, and Shuguang Ge*
Paper 897 **14:18-14:30**	**GPU Optimization of Biological Macromolecule Multi-tilt Electron Tomography Reconstruction Algorithm** *Zi-Ang Fu, Xiaohua Wan, and Fa Zhang*
Paper 811 **14:30-14:42**	**Fed-CSA: Channel Spatial Attention and Adaptive Weights Aggregation based-Federated Learning for Breast Tumor Segmentation on MRI** *Xinyu Dong, Zhenwei Shi, XiaoMei Huang, Chu Han, Zi-han Cao, Zhihe Zhao, Dan Wang, Peng Xu, Zaiyi Liu, and Wenbin Liu*
Paper 769 **14:42-14:54**	**DBL-MPE: Deep Broad Learning for Prediction of Response to Neo-adjuvant Chemotherapy Using MRI-based Multi-Angle Maximal Enhancement Projection in Breast Cancer** *Zihan Cao, Zhenwei Shi , XiaoMei Huang, Chu Han Xinyu Dong, Zhihe Zhao, Dan Wang, Peng Xu, Zaiyi Liu, and Wenbin Liu*
Paper 378 **14:54-15:06**	**SSTVC: Carotid plaque classification from ultrasound images using self-supervised triple-view contrast learning** *Cheng Li, Xiaoyue Fang, Ran Zhou, Zhi Yang, and Haitao Gan*
Paper 813 **15:06-15:18**	**Identify complex higher-order associations between Alzheimer's disease genes and imaging markers through Improved Adaptive Sparse Multi-View Canonical Correlation Analysis** *Yi-Ming Wang, Xiang-Zhen Kong, Bo-Xin Guan , Chun-Hou Zheng, and Ying Lian Ga*
Paper 448 **15:18-15:30**	**A segmentation method of 3D liver image based on multi-scale feature fusion and coordinate attention mechanism** *Meng Zhang, Xiaolong Zhang, He Deng, and Hongwei Ren*
Afternoon, August 12, Saturday, Room A	
Knowledge Discovery and Data Mining	
Chair: Chee Kiat Seow	
Paper 935 **15:40-15:52**	**Research on double input electric load forecasting model based on feature fusion** *Zi Wang, Tao Zhang, Sheng Zeng, and Bing Wang*
Paper 926 **15:52-16:04**	**TAP-AHGNN: An Attention-based Heterogeneous Graph Neural Network for Service Recommendation on Trigger-Action Programming Platform**

	Zijun Huang, Jiangfeng Li, Huijuan Zhang, Chenxi Zhang, and Gang Yu
Paper 262 **16:04-16:16**	**RNL: A Robust and Highly-Efficient Model for Time-Aware Web Service QoS Prediction** *Jiajia Mi and Hao Wu*
Paper 572 **16:16-16:28**	**Missing data analysis and soil compressive modulus estimation via Bayesian evolutionary trees** *Wenchao Zhang, Peixin Shi, Xiaoqi Zhou, and Pengjiao Jia*
Paper 695 **16:28-16:40**	**Music Emotion Recognition Using Multi-Head Self-Attention-Based Models** *Yao Xiao, Haoxin Ruan,Xujian Zhao, Peiquan Jin, and Xuebo Cai*
Paper 312 **16:40-16:52**	**Multivariate Time Series Anomaly Detection Method Based on mTranAD** *Chuanlei Zhang , Yicong Li , Jie Li , Guixi Li, and Hui Ma*
Paper 101 **16:52-17:04**	**Change-Point Detection Under Pearson-like Scaled-Bregman Divergence** *Tong Si, Yunge Wang, Lingling Zhang, Kate Cannell, Haijun Gong*
Paper 999 **17:04-17:16**	**A deep transfer fusion model for recognition of Acute Lymphoblastic leukemia with few samples** *Zhihua Du, Xin Xia, Min Fang, Li Yu, and Jianqiang Li*
Paper 392 **17:16-17:28**	**Proximal Symmetric Non-negative Latent Factor Analysis: A Novel Approach to Highly-Accurate Representation of Undirected Weighted Networks** *Yurong Zhong, Zhe Xie, Weiling Li, and Xin Luo*
Paper 217 **17:28-17:40**	**Undetectable Attack to Deep Neural Networks Without Using Model Parameters** *Chen Yang, Yinyan Zhang, and Ameer Hamza Khan*
Paper 524 **17:40-17:52**	**Information Extraction System for Invoices and Receipts** *QiuXing Michelle Tan, Qi Cao, Chee Kiat Seow, and Peter Chunyu Yau*
Afternoon, August 12, Saturday, Room B	
Natural Language Processing and Computational Linguistics	
Chair: Qingqing Li	
Paper 618 **15:40-15:52**	**Simple but Effective: Keyword-based Metric Learning for Event Sentence Coreference Identification** *Tailai Peng, Rui Chen, Zhe Cui,and Zheng Chen*
Paper 823 **15:52-16:04**	**A Content Word Augmentation Method for Low-Resource Neural Machine Translation** *Fuxue Li, Zhongchao Zhao, Chuncheng Chi, Hong Yan,and Zhen Zhang*
Paper 790 **16:04-16:16**	**Improving Neural Machine Translation by Retrieving Target Translation Template** *Fuxue Li, Chuncheng Chi, Hong Yan,and Zhen Zhang*

Paper 535 **16:16-16:28**	**Learning from Patterns via Pre-trained Masked Language Model for Semisupervised Automated Essay Scoring** *Jingbo Sun, Weiming Peng, Tianbao Song and Jihua Song*
Paper 953 **16:28-16:40**	**Exploiting Query Knowledge Embedding and Trilinear Joint Embedding for Visual Question Answering** *Zheng Chen and Yaxin Wen*
Paper 794 **16:40-16:52**	**Leveraging Inter-Class Differences and Label Semantics for Few-Shot Text Classification** *Xinran Xie, Rui Chen, Tailai Peng, Zhe Cui , and Zheng Chen*
Paper 834 **16:52-17:04**	**STADEE: STAtistics-based DEEp Detection of Machine Generated Text** *Zheng Chen and Huming Liu*
Paper 715 **17:04-17:16**	**Nucleus Beam Search for Machine Translation Decoding** *Zheng Chen, Ruiwen Tao, and Yifan Wang*
Paper 318 **17:16-17:28**	**UCM: Personalized Document-level Sentiment Analysis Based on User Correlation Mining** *Jiayue Qiu, Ziyue Yu, and Wuman Luo*
Paper 675 **17:28-17:40**	**Transition-based Mention Representation for Neural Coreference Resolution** *Qingqing Li and Fang Kong*
Afternoon, August 12, Saturday, Room C	
Biomedical Informatics Theory and Methods	
Chair: Yue Gao	
Paper 239 **15:40-15:52**	**Extraction of relationship between esophageal cancer and biomolecules based on BioBERT** *Dayu Tan, Yang Yang, Minglu Wang, Pengpeng Wang, Lejun Zhang, Tseren Onolt Ishdorj, and Yansen Su*
Paper 144 **15:52-16:04**	**Prediction of cancer driver genes based on pyramidal dynamic mapping algorithm** *Pi-Jing Wei, Shu-Li Zhou, Rui-Fen Cao, Yansen Su, and Chun-Hou Zheng*
Paper 143 **16:04-16:16**	**Generative adversarial network-based data augmentation method for anti-coronavirus peptides prediction** *Jiliang Xu, Chungui Xu, Ruifen Cao, Yonghui He, Yannan Bin, and Chun-Hou Zheng*
Paper 837 **16:16-16:28**	**Optimizing Cardiac Surgery Risk Prediction: An Machine Learning Approach with Counterfactual Explanations** *Dengkang Qin, Mengxue Liu, Zheng Chen,and Qian Lei*
Paper 632 **16:28-16:40**	**LANCMDA: Predicting MiRNA-Disease Associations via LightGBM with Attributed Network Construction** *Xu-Ran Dou, Wen-Yu Xi, Tian-Ru Wu, Cui-Na Jiao, Jin-Xing Liu, and Ying Lian Gao*

Paper 379 **16:40-16:52**	**Seizure prediction based on multidimensional EEG spatial matrix and residual network structure** *Jiahao Zhang, Qingfang Meng, and Zewen Wang*
Paper 822 **16:52-17:04**	**A Deep Learning Approach Incorporating Data Missing Mechanism in Predicting Acute Kidney Injury in ICU** *Yuan Zhang, Zhengbo Zhang, Xiaoli Liu, Lei Zha, Fengcong, Xiaorui Su, Bowei Zhao, Lun Hu, and Pengwei Hu*
Paper 302 **17:04-17:16**	**Spectral Clustering of Single-Cell RNA-Sequencing Data by Multiple Feature Sets Affinity** *Yang Liu, Feng Li, Junliang Shang, Daohui Ge, Qianqian Ren, and Shengjun Li*
Paper 828 **17:16-17:28**	**MOVNG*: Applied a Novel Sparse Fusion Representation into GTCN for Pan-cancer Classification and Biomarker Identification** *Xin Chen, Yun Tie, Fenghui Liu, Dalong Zhang, and Lin Qi*
Paper 997 **17:28-17:40**	**Spatial Domain Identification based on Graph Attention Denoising Autoencoder** *Yue Gao, Dai-Jun Zhang, Cui-Na Jiao, Ying-Lian Gao, and Jin-Xing Liu*

Afternoon, August 12, Saturday, Room D

Intelligent Computing in Drug Design

Chair: Yijia Zhang

Paper 722 **15:40-15:52**	**Deep Learning-based Prediction of Drug-Target Binding Affinities by Incorporating Local Structure of Protein** *Runhua Zhang, Baozhong Zhu, Tengsheng Jiang, Zhiming Cui, and Hongjie Wu*
Paper 750 **15:52-16:04**	**NIEE: Modeling Edge Embeddings for Drug-Disease Association Prediction via Neighborhood Interactions** *Yu Jiang, Jingli Zhou, Yong Zhang, Yulin Wu, Xuan Wang, and Junyi Li*
Paper 888 **16:04-16:16**	**A Novel Descriptor and Molecular Graph-Based Bimodal Contrastive Learning Framework for Drug Molecular Property Prediction** *Zhengda He, Linjie Chen , Hao Lv , Rui-ning Zhou, Jiaying Xu, Yadong Chen, Jianhua HU, and Yang Gao*
Paper 275 **16:16-16:28**	**An Efficient Drug Design Method Based on Drug-Target Affinity** *Haoran Liu, Xiaolong Zhang, Xiaoli Lin, and Jing Hu*
Paper 815 **16:28-16:40**	**A novel graph representation learning model for drug repositioning using graph transition probability matrix over heterogenous information networks** *Dong-Xu Li, Xun Deng, Bo-Wei Zhao, Xiao-Rui Su, Guo-Dong Li, Zhu-Hong You, Peng-Wei Hu, and Lun Hu*
Paper 515 **16:40-16:52**	**Multi-level Subgraph Representation Learning for Drug-Disease Association Prediction over Heterogeneous Biological Information Network** *Bo-Wei Zhao, Xiao-Rui Su, Yue Yang, Dong-Xu Li, Peng-Wei Hu, Zhu-Hong You, and Lun Hu*
Paper 921 **16:52-17:04**	**EEG Convolutional Sparse Transformer for Epilepsy Detection and Related Drug Classification**

	Zhengda He, Linjie Chen, Hao Lv , Rui-ning Zhou, Jiaying Xu, Yadong Chen, Jianhua HU, and Yang Gao
Paper 727 **17:04-17:16**	**Drug-target interaction prediction based on interpretable graph transformer model** *Baozhong Zhu, Runhua Zhang, Tengsheng Jiang, Zhiming Cui, and Hongjie Wu*
Paper 743 **17:16-17:28**	**A Transformer-based Deep Learning Approach with Multi-Layer Feature Processing for Accurate Prediction of Protein-DNA Binding Residues** *Haipeng Zhao, Baozhong Zhu, Tengsheng Jiang, Zhiming Cui, and Hongjie Wu*
Paper 232 **17:28-17:40**	**DTI-MACF: Drug-Target Interaction Prediction via Multi-component Attention Network** *Jiejin Deng, Yijia Zhang, Jing Zhang, Yaohua Pan, and Mingyu Lu*

The Nineteenth International Conference on Intelligent Computing

Zhengzhou, China, August, 10-13, 2023

Website: http://www.ic-icc.cn/2023/

Email: icic@ic-icc.cn