Chin-Teng Lin ⓘ
IEEE CIS 2022 Awards Committee Chair
University of Technology Sydney, AUSTRALIA

2023 IEEE CIS Awards

Neural Network Pioneer Awards
Donald C. Wunsch II,
Missouri University of Science and Technology, USA

For contributions to unsupervised and reinforcement learning.

Donald C. Wunsch II (Fellow, IEEE) received the B.S. degree in applied mathematics from the University of New Mexico, Albuquerque, NM, USA, the Jesuit Honors Program from Seattle University, Seattle, WA, USA, the Kellogg Graduate Certificate of Nonprofit Management from Northwestern University, Evanston, IL, USA, the M.S. degree in applied mathematics from the University of Washington, Seattle, WA, USA, the M.B.A. degree from Washington University, St. Louis, MO, USA, and the Ph.D. degree in electrical engineering from the University of Washington. He is currently the Mary K. Finley Missouri Distinguished Professor with the Missouri University of Science and Technology (Missouri S&T), Rolla, Missouri. He is the inaugural Director of the Kummer Institute Center for Artificial Intelligence and Autonomous Systems, Missouri S&T and Director of the Applied Computational Intelligence Laboratory. He was with Texas Tech, Lubbock, TX, Boeing, Seattle, WA, Rockwell International, Albuquerque, NM, and International Laser Systems, Albuquerque, NM. His research interests include real-time learning, unsupervised learning, reinforcement learning, and their applications. He was the recipient of the International Neural Networks Society (INNS) Fellow, NSF CAREER, INNS Gabor Award, INNS Ada Lovelace Award, and IEEE Neural Networks Pioneer Award. He was INNS President, IJCNN General Chair, and on the St. Patrick's School Board, IEEE Neural Networks Council, INNS Board, and the University of Missouri Bioinformatics Consortium, chaired the Missouri S&T Information Technology and Computing Committee and the Student Design and Experiential Learning Center Board. He was also the Program Director with the National Science Foundation 2021 - 2022. He produced 23 Ph.D. recipients of computer engineering, electrical engineering, systems engineering, and computer science.

Fuzzy Systems Pioneer Award
Hao Ying,
Wayne State University, USA

For fundamental contributions to model-free fuzzy control theory and its biomedical applications.

Hao Ying (Fellow, IEEE) received the B.S. and M.S. degrees in electrical engineering from Donghua University (formerly, China Textile University), Shanghai, China, in February 1982 and 1984, respectively, and the Ph.D. degree in biomedical engineering from The University of Alabama at Birmingham, Birmingham, AL, USA, in 1990. He is currently a Professor with the Department of Electrical and Computer Engineering, Wayne State University, Detroit, MI, USA.

He began researching fuzzy control in 1981 when it was very young. The field's common practice back then was to empirically construct and experimentally investigate a fuzzy controller using the intuitive linguistic-rule-based, model-free approach pioneered by E.H. Mamdani in 1974. While practically useful, this approach often required significant trial-and-error and also resulted in a blackbox controller, making it impossible to precisely and fully understand how and why it worked, let alone rigorously analyze or systematically design it. This and other related weaknesses and issues made fuzzy control highly controversial and poorly perceived by academic control communities in the 1980s and 90s. Through extensive research and publications, Professor Ying not only created an innovative and rigorous mathematical model-free fuzzy control theory, but also demonstrated its practical value by showing how to apply the theory to challenging real-world biomedical problems. One of the applications is his 1989 real-time fuzzy controller for controlling hypertension in patients recovering from open-heart surgery in the Cardiac Surgical Intensive Care Unit in Birmingham, which is the world's first attempt on fuzzy control in clinical medicine.

He has authored one single-author book entitled *Fuzzy Control and Modeling: Analytical Foundations and Applications* (IEEE Press, 2000, 342 pages; foreword by Professor Lotfi A. Zadeh), which comprehensively presents his theory, and also coauthored a 2014 book titled

Introduction to Type-2 Fuzzy Logic Control: Theory and Applications and published 128 journal papers. He is an Associate Editor or a Member of Editorial Board for 13 international journals, including the IEEE Transactions on Fuzzy Systems and IEEE Transactions on Systems, Man, and Cybernetics: Systems.

Evolutionary Computation Pioneer Award
Stephanie Forrest,
Arizona State University, USA
For contributions to artificial immune systems and fitness landscapes.

Stephanie Forrest (Fellow, IEEE) received the B.A. degree from St. John's College and the M.S. and Ph.D. degrees in computer science from the University of Michigan, Ann Arbor, MI, USA. She is/was with Arizona State University, Tempe, AZ, USA, directs the Biodesign Center for Biocomputation, Security and Society, and is currently a Professor with the School of Computing and Augmented Intelligence. Before joining ASU in 2017, she was a Distinguished Regents Professor of computer science with the University of New Mexico, Albuquerque, NM, USA, and spent five years as the Department Chair. She is currently a Member of the Santa Fe Institute External Faculty and has the Co-Chair of its Science Board and Interim VP for Academic Affairs. During 2013–2014, she was with the U.S. Department of State in the role of Senior Science Advisor for cyberpolicy.

Her interdisciplinary research focuses on the intersection of biology and computation, including evolutionary computation, biological modeling, cybersecurity, and software engineering. Her early research on computational aspects of the immune system pioneered the field now known as Artificial Immune Systems (AIS), with sustained impact on cybersecurity and biological modeling. Her work on fitness landscapes identified a new source of evolutionary computation problem difficulty and proposed the Royal Road functions, a class of functions designed explicitly to lead the GA to the optimum value. Her current research demonstrated how evolutionary computation can be used to improve software code itself, including repairing bugs, reducing energy consumption, and optimizing GPU codes. This work has stimulated wide interest in the field now known as automated program repair.

She was the recipient of four test-of-time awards for high-impact conference papers published in the IEEE Symposium on Security and Privacy, International Conference on Software Engineering, and Genetic and Evolutionary Computation Conference (twice), ten best conference paper awards, Humies Gold Medal, and she has an H-index (Google Scholar) of 79. Some of her other awards include: The Lifetime Achievement Award from the International Society for Artificial Life, Santa Fe Institute Stanislaw Ulam Memorial Lectures, ACM/AAAI Allen Newell Award, Manfred Paull Award for Excellence in Software: Theory and Practice, and NSF Presidential Young Investigator Award.

Prof. Forrest serves on the Computing Research Association Board of Directors, ACM Transactions of Evolutionary Learning and Optimization Advisory Board, Genetic Programming and Evolvable Machines Editorial Board, and Evolutionary Computation Advisory Board.

Enrique Ruspini Meritorious Service Award
Hisao Ishibuchi,
Southern University of Science and Technology, China
For leadership to improve the reputation of the IEEE CIM and facilitate technical activities of the society.

Hisao Ishibuchi received the B.S. and M.S. degrees from Kyoto University, Kyoto, Japan, in 1985 and 1987, respectively, and the Ph.D. degree from Osaka Prefecture University, Sakai, Japan, in 1992. Since 1987, he has been with Osaka Prefecture University as a Research Associate during 1987–1993, Assistant Professor in 1993, Associate Professor during 1994–1999, and Full Professor during 1999–2017. He is currently with the Southern University of Science and Technology, Shenzhen, China, as a Chair Professor.

He has been the Chair of a number of international conferences, such as the General Chair of ICMLA 2011, IEEE CIFEr 2019, EMO 2021 and WCCI 2024, and Program Chair of SoCPaR 2009, IEEE CEC 2010, IES 2014, ICACI 2018, and IEEE SSCI 2022. In the IEEE CIS, he was the TC Chair of the Fuzzy Systems Technical Committee during 2008–2009, the Vice-President of technical activities during 2010–2013, an AdCom Member during 2014–2019, and 2021–2023, the Editor-in-Chief of *IEEE Computational Intelligence Magazine* during 2014–2019, and a Distinguished Lecturer during 2015–2017, and 2021–2023. He was also an Associate Editor for IEEE Transactions on Fuzzy Systems during 2004–2014, *IEEE Computational Intelligence Magazine* during 2006–2013, IEEE Transactions on Evolutionary Computation during 2007–2022, IEEE Transactions on Cybernetics during 2013–2022, and IEEE Access during 2013–2022.

He was the recipient of the JSPS Prize in 2007, IEEE CIS Fuzzy Systems Pioneer Award in 2019, IEEE Transactions on Evolutionary Computation Outstanding Paper Award in 2020, and Best Paper Award from a number of international conferences, such as GECCO 2004, 2017, 2018, 2020, 2021, FUZZ-IEEE 2009, 2011, and EMO 2019. His students were the recipients of the Student Best Paper Award from a number of international conferences, such as IEEE CEC 2020 and FUZZ-IEEE 2020.

Janusz Kacprzyk,
Polish Academy of Sciences, Poland
For contributions to strengthen the IEEE Computational Intelligence Society.

Janusz Kacprzyk (Fellow, IEEE) is currently a Professor of computer science with the Systems Research Institute, Polish Academy of Sciences, WIT – Warsaw School of Information Technology, and Chongqing Three Gorges University, Wanzhou, China, and a Professor of automatic control with the PIAP – Industrial Institute of Automation and Measurements, Warsaw, Poland. He is a Honorary Foreign Professor with the Department of Mathematics, Yli Normal University, Xinjiang, China. He is a Full Member of the Polish Academy of Sciences, Member of Academia Europaea, European Academy of Sciences and Arts, European Academy of Sciences, Foreign Member of the: Bulgarian Academy of Sciences, Spanish Royal Academy of Economic and Financial Sciences, Finnish Society of Sciences and Letters, Flemish Royal Academy of Belgium of Sciences and the Arts, National Academy of Sciences of Ukraine and Lithuanian Academy of Sciences. He was the recipient with seven honorary doctorates. He is Fellow of IET, IFSA, EurAI, IFIP, AAIA, I2CICC, and SMIA.

He authored seven books, (co) edited more than 150 volumes, authored or coauthored more than 650 papers, including ca. 150 in journals indexed by the WoS. He is listed in 2020 and 2021 World's 2% Top Scientists by Stanford University, Stanford, CA, USA, Elsevier (Scopus) and ScieTech Strategies and published in PLOS Biology Journal. His main research interests include the use of modern computation, computational and artificial intelligence tools, notably fuzzy logic, in systems science, decision making, optimization, control, data analysis and data mining, with applications in mobile robotics, systems modeling, and ICT.

He is the Editor-in-chief of eight book series at Springer, and of two journals, and is on the editorial boards of ca. 40 journals. He is the President of the Polish Operational and Systems Research Society and Past President of International Fuzzy Systems Association.

IEEE Transactions on Neural Networks and Learning Systems Outstanding Paper Award
"Multiview Uncorrelated Locality Preserving Projection," by Jun Yin and Shiliang Sun, Vol. 31, pp. 3442-3455, 2020.

IEEE Transactions on Fuzzy Systems Outstanding Paper Award
"Fuzzy Multiple-Source Transfer Learning," by Jie Lu, Hua Zuo, Guangquan Zhang, Vol. 28, No. 12, pp. 3418-3431, December 2020.

IEEE Transactions on Evolutionary Computation Outstanding Paper Award
"Multifactorial Evolutionary Algorithm With Online Transfer Parameter Estimation: MFEA-II," by Kavitesh Kumar Bali, Yew-Soon Ong, Abhishek Gupta, Puay Siew Tan, Vol. 24, No. 1, pp. 69-83, February 2020.

IEEE Transactions on Cognitive and Developmental Systems Outstanding Paper Award
"Computational Modeling of Embodied Visual Perspective Taking," by Tobias Fischer and Yiannis Demiris, Vol. 12, No. 4, pp. 123-132, 2020.

IEEE Transactions on Games Outstanding Paper Award
"Winning Is Not Everything: Enhancing Game Development With Intelligent Agents," by, Yunqi Zhao, Igor Borovikov, Fernando de Mesentier Silva, Ahmad Beirami, Jason Rupert, Caedmon Somers, Jesse Harder, John Kolen, Jervis Pinto, Reza Pourabolghasem, James Pestrak, Harold Chaput, Mohsen Sardari, Long Lin, Sundeep Narravula, Navid Aghdaie, Kazi Zaman, Vol. 2, No. 2, pp. 199-212, June 2020.

IEEE Transactions on Emerging Topics in Computational Intelligence Outstanding Paper Award
"An Adaptive Archive-Based Evolutionary Framework for Many-Task Optimization," by Yongliang Chen, Jinghui Zhong, Liang Feng and Jun Zhang, Vol. 4, No. 3, pp. 369-384, June 2020.

IEEE Computational Intelligence Magazine Outstanding Paper Award
"How Intense Are You? Predicting Intensities of Emotions and Sentiments using Stacked Ensemble," by Md Shad Akhtar, Asif Ekbal, and Erik Cambria, Vol. 15, No. 1, pp. 64-75, 2020.

Outstanding Chapter Award
IEEE Computational Intelligence Chapter, Bangalore Section.

For excellence in outreach activities, exposing high school children to computational intelligence and successful engagement with industry on various levels.

Outstanding Organization Award
Video Systems Srl
For contributions using computational intelligence for product quality control.

Video Systems was founded in 1993 by founder Luigi Liani and his son Alessandro, now CEO and R&D director of the company. From the beginning, the company's mission has been to support the manufacturing world in reducing its environmental impact and developing more efficient processes in the production of goods for the market.

In 2001, the company decided to invest in research activities in the field of artificial intelligence, believing that this science is potentially one of the keys to the future. In the first ten years of research and development of solutions based on machine learning and AI, the road was not an easy one. Starting with

academic publications, Video Systems implemented various neural network architectures to meet the needs of its customers.

Thanks to the advent of GPUs and the emergence of a number of open source projects in this field, the development path has been 'easier', but challenges and unknowns accompany every step we take on this journey. Today, the company integrates robotics, machine vision, IoT and computational intelligence to create solutions for the manufacturing world, always with the goal of helping the industry reduce waste and energy needs in particular on fields like steel production market, automotive and hollow glass production markets.

Peculiarity of Video Systems is the ability to develop both the hardware components (electronic boards, mechanics, optics, embedded systems) and the software components of a machine vision solution integrating AI based solutions.

Video Systems has been collaborating internationally for several years in research projects focused on the Zero Defect Manufacturing paradigm and today applies its knowledge in the field of artificial intelligence to create increasingly high-performance and innovative solutions. The company designs and produces quality control systems based on embedded platforms of its own creation combined with AI solutions, and does so with the perseverance that a major objective such as sustainability challenges requires. Alessandro firmly believes in this vision, motivating his team and the people around him with statements such as "I believe that we can all contribute for a better world, we need to use technology to improve this world from the perspective of sustainability, inclusiveness and leave it to our children better than we found it," and in this path he is convinced that associations such as the IEEE are one of the ideal places where people can contribute to current sustainability challenges and on new fields such as the new space race

that will allow us to develop innovative technologies for a better world.

Outstanding Early Career Award
Bing Xue,
Victoria University of Wellington, New Zealand

For contributions to the development and application of evolutionary machine learning.
Bing Xue received the Ph.D. degree in artificial intelligence from the Victoria University of Wellington (VUW), Wellington, New Zealand, in 2014. She is currently a Professor of artificial intelligence, and the Deputy Head of the School for Engineering and Computer Science, VUW. Her research interests include evolutionary computation, machine learning, Big Data, feature selection/learning, evolving neural networks, explainable AI, and their real-world applications. She has more than 300 papers published in fully refereed international journals and conferences, including many highly cited papers and top most popular papers, and more than 100 publications in prestigious journals, such as IEEE TEVC, IEEE TNNLS, IEEE TCYB, and *Pattern Recognition*. She established and is currently leading the Feature Analysis, Selection, and Learning in Image and Pattern Recognition (FASLIP) Group with VUW with more than 25 staff and research students. She was the recipient of a number of awards, including Best Paper Awards from international conferences, and Early Career Award, Research Excellence Award and Supervisor Award from her University. She is the Chair of the Evolutionary Computation Technical Committee, Editor of IEEE CIS Newsletter, and a Member of several (sub-) committees in IEEE CIS. She has also been the Associate/Guest Editor or Editorial Board Member for more than ten international journals, including IEEE TEVC and IEEE CIM. She has been invited to give many plenary talks, keynotes, tutorials or invited talks in international conferences or events, including a

plenary talk in IEEE WCCI 2022. She is also the Key Chair of many international conferences, including the Conference Chair of CEC in IEEE WCCI 2024.

Outstanding PhD Dissertation Award

Danial Yazdani, for his thesis entitled Particle Swarm Optimization for Dynamically Changing Environments with Particular Focus on Scalability and Switching Cost for the Doctor of Philosophy degree from Liverpool John Moores University, Liverpool, U.K., in October 2018.
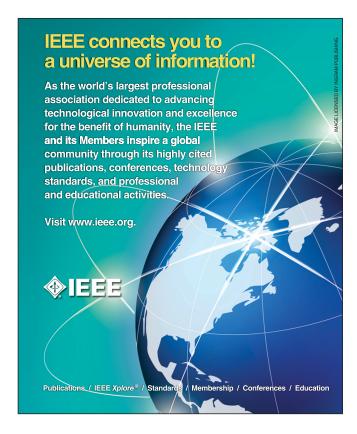
Supervisors: Trung Thanh Nguyen, Liverpool John Moores University, Liverpool, U.K., and Juergen Branke, University of Warwick, Coventry, U.K..

Abstract: Change is an inescapable aspect of natural and artificial systems, and adaptation is central to their resilience. Optimization problems are no exception to this maxim. Indeed, the search space of many problems changes over time. Such optimization problems are denoted as dynamic optimization problems (DOPs) in the literature. This thesis focuses on two important and complex classes of DOPs, namely robust optimization over time (ROOT) and large-scale DOPs.

The field of ROOT deals with DOPs in which frequent changes of the deployed solution are undesirable. This can be due to the high cost of switching the deployed solutions, the limitation of the needed resources to deploy such new solutions, and/or the system being intolerant towards frequent changes of the deployed solution. In this thesis, a ROOT framework is proposed that searches for robust solutions based on the learned problem space characteristics. This thesis then adapts the proposed ROOT framework for tackling two different classes of ROOT problems: 1) the ones in which it is preferred to keep the deployed solution as long as it remains acceptable after environmental

changes and 2) for the problems in which the cost of switching the deployed solution and the benefits from deploying a candidate solution are taken into account. In addition to ROOT, this research investigates large-scale DOPs. In this thesis, the challenges of large-scale DOPs are studied, a scalable benchmark generator with controllable variable interaction structure is proposed, and a novel algorithm is designed. The proposed algorithm benefits from different components including a bi-level multi-population controlling, cooperative coevolution, and a bi-level computational resource allocation.

The reported results in this thesis demonstrate the superiority of the proposed methods in comparison to the peer algorithms. Several publications are generated by the research reported in this thesis, including the ones published in the IEEE Transactions on Evolutionary Computation.