

IEEE Fellows—Class of 2020

Hussein Abbass
University of New South Wales,
AUSTRALIA

for contributions to evolutionary learning and optimization.



Hussein is a Professor at the School of Engineering and Information Technology, University of New South Wales, Australia. He received his BA,

PG.Dip., and M.Sc. from Cairo University in 1990, 1992, and 1995, respectively, an M.Sc. in Artificial Intelligence (AI) from the University of Edinburgh in 1997, and a PhD in data mining from Queensland University of Technology in 2001. He pioneered the Pareto-based Neural Network Ensemble algorithms, where multiple neural networks concurrently learn to solve problems with conflicting requirements and objectives. His current research is developing the AI algorithms and architectures to design ground, air and software-based trusted autonomous systems with similar cognitive decision-making abilities to sheepdogs. He is an advocate for trusted autonomous and AI systems, and the need for ethical and responsible social integration of AI in the human society. His outreach activities promote AI4ALL, to educate the community on AI.

Prof. Abbass served as the Vice-President for Technical Activities for the IEEE Computational Intelligence Society (2016–2019) and the National President of the Australian Society for Operations Research (2016–2019). He is an associate Editor of the IEEE Transactions on Neural Networks and Learning Systems,

IEEE Transactions on Evolutionary Computation, IEEE Transactions on Cybernetics, IEEE Transactions on Cognitive and Developmental Systems, and four other journals. He is a Fellow of IEEE, the Australian Computer Society, the UK Operations Research Society, and the Australian Institute of Managers and Leaders. He is currently the Founding Editor in Chief of the IEEE Transactions on Artificial Intelligence.

Krzysztof J. Cios
Virginia Commonwealth
University, USA

for contributions to data mining and machine learning.



Prof. Krzysztof J. Cios is a Chair of the Department of Computer Science at Virginia Commonwealth University (VCU) in Richmond, Virginia.

He is a Member of the European Academy of Sciences and Arts, a Fellow of the American Institute for Medical and Biological Engineering, and a Foreign Member of the Polish Academy of Arts and Sciences. He has been the recipient of numerous other honors including the Norbert Wiener Outstanding Paper Award (Kybernetes), the University of Toledo Outstanding Faculty Research Award, the Neurocomputing Best Paper Award, and the Fulbright Senior Scholar Award. Prof. Cios is listed by the Kosciuszko Foundation (New York City) as one of the eminent scientists of Polish origin or ancestry.

He earned his M.S. and Ph.D. degrees from the AGH University of Science and Technology, Kraków, Poland, a D.Sc. (habilitation) degree from the Polish Academy of Sciences, and an M.B.A. degree from the University of Toledo, Ohio.

Prof. Cios worked at the University of Toledo, where he co-founded Department of Bioengineering and served as its Acting Chair. He also worked as a Visiting Scientist at NASA Glenn Research Center in Ohio. He then served as Chair of the Computer Science and Engineering Department at the University of Colorado Denver, where he started its Ph.D. program in Computer Science and Information Systems, and got its first-ever ABET accreditation. He consulted for Lockheed Martin and Raytheon companies, and worked as a Visiting Professor at the Complutense University in Madrid, Spain, and at the Muroran Institute of Technology in Japan. Prof. Cios started a dual Ph.D. degree program in computer science between VCU and the University of Cordoba, Spain; students satisfying requirements of both universities, including six months research stay at the other institution, receive two Ph.D. degrees: one from each university.

During his academic career Prof. Cios served as primary advisor to 17 Ph.D. and 20 M.S. students. The former work at universities in the U.S. (one as endowed chair), Australia, Thailand and Vietnam, as post-doctoral researchers, and at companies such as Google, Amazon Robotics, NASA, General Motors, and Procter & Gamble.

Zhongsheng Hou
Qingdao University, CHINA

for contributions to data-driven learning and control with applications in transportation systems.



Zhongsheng Hou is a Chair Professor in Qingdao University, China. He received his Ph.D. from Northeastern University, China, in 1994. From

1997 to 2018, he was a Distinguished Professor and the Head of Department of Automatic Control in Beijing Jiaotong University, China. He is the founding Director of the Technical Committee on Data Driven Control, Learning and Optimization (DDCLO), Chinese Association of Automation (CAA). He is a Fellow of CAA, and also an IFAC Technical Committee Member on both of “Adaptive and Learning Systems” and “Transportation Systems”. His research interests are in the model free adaptive control (MFAC), data-driven learning & control (DDL), and intelligent transportation systems.

Prof. Hou initiated the MFAC for unknown non-affine discrete-time nonlinear systems in 1994. MFAC has been developed into a systematic framework consisting of indirect and direct methods, with original concepts, such as, pseudo-gradient, generalized Lipschitz conditions; three kinds of novel dynamic linearization data modeling approaches; a series of control system design methods including adaptive/predictive/learning controls, etc.; typical contraction-mapping based stability analysis framework; the new robustness definition and many other extensions. The main feature of MFAC is that the control system design needs only the closed-loop I/O data, and almost all the fundamental issues, such as, unmodelled dynamics vs robustness, persistent excitation vs closed-loop feedback, accurate modeling vs model reduction, can be avoided. MFAC includes the traditional adaptive control for linear time invariant systems and traditional PID as special cases. MFAC has been recognized by citations as a whole Chapter/Section in 11 books, and by more than 160 different field applications and laboratory equipment, including the wide-area power systems, autonomous vehicles, and temperature control of silicon rod, etc.

Since 2009, he further works on a larger and challenging research domain, i.e., the DDL and its applications in traffic (road/freeway/train) control field. The DDL method can be designed only using the system operation data, which has opened a way for utilization

of process data and repetitive pattern, and might be recognized as a milestone for the theoretical development of the learning and adaptive control methods.

Tianzi Jiang
Institute of Automation, Chinese Academy of Sciences, CHINA

for contributions to neuroimaging techniques.



Tianzi Jiang is currently a Professor and Director of Beijing Key Laboratory of Brainnetome, and the Brainnetome Center at Institute of Automation of the Chinese Academy of Sciences (CASIA). He is also a Chief Professor at University of the Chinese Academy of Sciences, a Changjiang Professor at University of Electronic Science and Technology of China, and a Professor at Queensland Brain Institute, University of Queensland, Australia. He received his BSc degree from Lanzhou University in 1984 and MSc and PhD degrees from Zhejiang University in 1992 and 1994. He worked as a post-doctoral research fellow (1994–1996) and an Associate Professor (1996–1999), and full professor (1999–present) at CASIA. During that time, he worked as a Vice-Chancellor's Postdoctoral Fellow at the University of New South Wales in Australia, and a Visiting Scientist at Max Planck Institute for Human Cognitive and Brain Sciences in Germany, a Research Fellow at Queen's University of Belfast in the UK, and a Visiting Professor at University of Houston in the USA. His research interests include multiscale brainnetome atlas, neuroimaging, and their applications in understanding of brain functions and disorders.

Dr. Jiang is/was an editor or editorial board member of 10+ journals, including IEEE Trans. on Medical Imaging, IEEE Trans. on Cognitive and Developmental Systems, NeuroImage, Frontiers in Neuroinformatics, and Neuroscience Bulletin. He has chaired for conferences, symposium and workshops for 10+ times, including MICCAI'2010, BCW'2012, and ICPR'2018, IJCNN'2021. He has

served as a reviewer for 100+ prestigious international journals including T-PAMI, T-MI, T-IP, T-BME, IJCV, PNAS, Nature Methods, and Nature Protocols. He was invited speaker at over 40 international conferences and workshops, including the keynote speech at the 25th Annual Meeting of the Organization for Human Brain Mapping (OHBM'2019), the plenary speech at the 25th International Symposia on Morphological Sciences (ISMS 2017), and the invited speech of 2010 New Horizons in Human Brain Mapping: A Focus on Brain Networks and Connectivity. He was elected a member of the Academy of Europe and a Fellow of American Institute for Medical and Biological Engineering.

Fakhri Karray
University of Waterloo, CANADA

for contributions to intelligent systems.



Fakhri Karray is the Loblaw's Research Chair in Artificial Intelligence in the department of electrical and computer engineering at the University of Waterloo and the co-director of the Institute of Artificial Intelligence. He received his Ing. Dip degree in Electrical Engineering from University of Tunis, and the PhD degree from University of Illinois Urbana Champaign, respectively in 1984 and 1989. Karray's research interests are in the areas of intelligent systems design, information sensor fusion, augmented intelligence, concept mining, machine learning, and context aware machines. He applied his work to solve a wide range of problems in intelligent transportation systems, Internet of things, cognitive robotics and natural man-machine interaction. He has authored extensively in these areas and disseminated his work in journals, conference proceedings, and textbooks. He is the co-author of 16 US patents. He has served as the associate editor/guest editor for several journals, including the IEEE Transactions on Cybernetics, the IEEE Transactions on Neural Networks and Learning Systems, the IEEE

Transactions on Mechatronics, the IEEE Computational Intelligence Magazine. He has chaired/co-chaired several international conferences (IEEE and otherwise), and has been the founding Chair of the IEEE CIS Chapter in Kitchener/Waterloo, and has Chaired the IEEE CIS Committee on Continuing Education. He was an IEEE Distinguished Lecturer in 2016.

He is the recipient of the University of Waterloo Outstanding Performance Award (2008), University of Waterloo Distinguished Performance Award (2019), the Premier Research Excellence Award (2000), the Elsevier's Pattern Recognition Best Paper Award (2012), the World Automation Congress' Anderson Best Paper Award (1997), and the IEEE Appreciation Certificate for Notable Services and Contributions to IEEE and the Engineering Profession (2019). He is a Fellow of the Canadian Academy of Engineering, a Fellow of the Engineering Institute of Canada and serves as the president for the Association for Image and Machine Intelligence, which organizes the yearly conference International Conference on Image Analysis and Recognition.

Hak-Keung Lam
King's College London, UK

for contributions to analysis and design of fuzzy model-based control systems.



Hak-Keung Lam received the B.Eng. (Hons.) and Ph.D. degrees from the Department of Electronic and Information Engineering, The Hong Kong Polytechnic University, Hong Kong. He is a Reader with the Department of Engineering, King's College London, United Kingdom. He is being recognized for contributions to analysis and design of fuzzy model-based control systems. He has made contributions to the two research sub-fields: membership-function-dependent analysis and interval type-2 fuzzy control systems under the fuzzy-model-based control framework. He proposed membership-function-dependent analysis

techniques and imperfect premise matching concept which remove the long-standing fundamental issues and overcome some long-existing challenges in the analysis and design of fuzzy-model-based control systems. He initiated the modeling concept and coined the analysis and design techniques for interval type-2 fuzzy model-based control systems. His research interests include fuzzy control, computational intelligence and machine learning.

H.K. Lam has authored/co-authored over 340 papers which have received citations over ten thousand times and with h-index of 55 from Google Scholar. He is an Associate Editor for IEEE Transactions on Fuzzy Systems, IEEE Transactions on Circuits and Systems II: Express Briefs, IET Control Theory and Applications, International Journal of Fuzzy Systems, Neurocomputing, and Nonlinear Dynamics, and on the editorial boards of many international journals. He was named as highly cited researcher for 2018 and 2019, and an IEEE Fellow.

Yun Li
Dongguan University of Technology, CHINA

for application of computational intelligence to system design and control.



Yun Li received the B.S. degree in electronics science from Sichuan University in 1984, the M.E. degree in electronic engineering from University of Electronic Science and Technology of China in 1987, and the Ph.D. degree in parallel computing and control from University of Strathclyde, U.K. in 1990.

In 1989, he was Control Engineer with the U.K. National Engineering Laboratory. In 1990, he was Postdoctoral Research Engineer with Industrial Systems and Control Ltd, Glasgow. From 1991 to 2018, he was Lecturer, Senior Lecturer and Professor with University of Glasgow and was Founding Director, University of Glasgow Singapore. He is currently Founding Director of Dong-

guan Industry 4.0 Artificial Intelligence Laboratory and a Distinguished Professor with Dongguan University of Technology, China. Since 1991, his research group's interest has been computational artificial intelligence and its applications. He is the author of the popular 1997 online interactive courseware for evolutionary algorithms, EA_demo (<http://i4ai.org/EA-demo/>). He has been granted 10 patents and has published 270 papers, one of which is among the IEEE TSMC-B's Top 5 and another the IEEE TCST's Most Popular every month.

Prof. Li is a Fellow of the Royal Society of Arts in the U.K. and co-led U.K.'s key programme "Industrial Systems in the Digital Age". He is an Associate Editor of the IEEE TEVC, TNNLS, and TETCI, and chaired the U.K. funding council's "Looking Beyond Industry 4.0" conference in Glasgow in 2017.

Xiaodong Li
RMIT University, AUSTRALIA

for contributions to large-scale and particle swarm optimization.



Xiaodong Li is currently a professor of Artificial Intelligence with the School of Science (Computer Science and Software Engineering discipline) at RMIT University, Melbourne, Australia. He leads an interdisciplinary research group on Evolutionary Computation and Machine Learning (ECML). He received a B.Sc. from Xidian University, China, and a Ph.D. in Artificial Intelligence from Otago University, New Zealand, in 1988 and 1997 respectively. He was with Charles Sturt University and then Monash University from 1997 to 2000 and joined RMIT University since 2001. He was a visiting research fellow at CERCIA, University of Birmingham, UK, from July to September 2008.

His research interests include machine learning, evolutionary computation, data analytics, multiobjective optimization, multimodal optimization, and swarm intelligence. He is the recipient of 2013 ACM SIGEVO Impact Award and 2017

IEEE CIS IEEE Transactions on Evolutionary Computation Outstanding Paper Award. He has published over 200 refereed journal and conference papers. His team won the first place in the IEEE CEC'2019 competition on Large-Scale Global Optimization (LSGO).

He serves as an Associate Editor of the IEEE Transactions on Evolutionary Computation, Swarm Intelligence (Springer), and International Journal of Swarm Intelligence Research. He is a founding member of IEEE CIS Task Force on Swarm Intelligence, a vice-chair of IEEE Task Force on Multi-modal Optimization, and a former chair of IEEE CIS Task Force on Large-Scale Global Optimization.

Ujjwal Maulik
Jadavpur University, INDIA

for development of algorithms in evolutionary clustering and bioinformatics.



Dr. Maulik completed his bachelor both in Physics and Computer Science from Calcutta University and master and Ph. D. from Jadavpur University, Kolkata, India. Currently he is a Professor in the Department of Computer Science and Engineering, Jadavpur University since 2004. He was also the former chair of the same Department. He held the position of the Principal in charge and the Head of the Department of Computer Science and Engineering, Kalyani Government Engineering College. Dr. Maulik worked in many universities and research laboratories around the world as visiting Professor/Scientist including Los Alamos National Lab., USA in 1997, Univ. of New South Wales, Australia in 1999, Univ. of Texas at Arlington, USA in 2001, Univ. of Maryland at Baltimore County, USA in 2004, Fraunhofer Institute for Autonomous Intelligent Systems, St. Augustin, Germany in 2005, Tsinghua Univ., China in 2007, Sapienza Univ., Rome, Italy in 2008, Univ. of Heidelberg, Germany in 2009, German Cancer Research Center (DKFZ), Germany in 2010, 2011 and 2012, Grenoble INP,

France in 2010, 2013 and 2016, University of Warsaw in 2013 and 2019, University of Padova, Italy in 2014 and 2016, Corvinus University, Budapest, 2015 and 2016, University of Slovenia in 2015 and 2017, International Center for Theoretical Physics (ICTP) in 2014, 2017 and 2018. He is the recipient of Alexander von Humboldt Fellowship during 2010, 2011 and 2012 and Senior Associate of ICTP, Italy during 2012–2018. He has also visited many more countries for delivering invited lectures and attending meetings. Dr. Maulik has already supervised twenty doctoral students who are working in well-known academic institutions around the world. He was the Chair of the IEEE Computational Intelligence Society (CIS), Kolkata Chapter, India, 2013, 2014 and 2016. He is the Fellow of Institute of Electrical and Electronics Engineers (IEEE), International Association for Pattern Recognition (IAPR), Indian Academy of Engineers (INAE).

Dr. Maulik has published 9 books and more than 300 research publications in well-known journals and conferences. He is severing in the editorial board of a number of well-known journals. His research interests include Computational Intelligence and Machine Learning, Pattern Recognition and Data Mining, Bioinformatics, Multi-objective Optimization and Social Networking.

Yongduan Song
Chongqing University, CHINA

for contributions to neural adaptive and fault-tolerant control techniques.



Yongduan Song received the Ph.D. degree in electrical and computer engineering from Tennessee Technological University, Cookeville, TN, USA, in 1992. He held a tenured Full Professor with North Carolina A&T State University, Greensboro, NC, USA, from 1993 to 2008 and a Langley Distinguished Professor with the National Institute of Aerospace, Hampton, VA, USA, from 2005 to 2008. He is currently the Dean of the School of

Automation, Chongqing University, Chongqing, China. He was one of the six Langley Distinguished Professors with the National Institute of Aerospace (NIA), Hampton, VA, USA, and the Founding Director of Cooperative Systems with NIA.

His current research interests include intelligent systems, guidance navigation and control, bio-inspired adaptive and cooperative systems.

Prof. Song was a recipient of several competitive research awards from the National Science Foundation, the National Aeronautics and Space Administration, the U.S. Air Force Office, the U.S. Army Research Office, and the U.S. Naval Research Office.

He has served/been serving as an Associate Editor of a number of journals, including the IEEE Transactions on Automatic Control, IEEE Transactions on Neural Networks and Learning Systems, IEEE Transactions on Intelligent Transportation Systems, IEEE Transactions on Systems, Man and Cybernetics, and IEEE Transactions on Developmental and Cognitive Systems, etc.

Zhigang Zeng
Huazhong University of Science and Technology, CHINA

for contributions to analysis and synthesis of neurodynamic systems.



Zhigang Zeng is a Professor at School of Artificial Intelligence and Automation, Huazhong University of Science and Technology, Wuhan, Hubei, China. He received the Doctor of Science Degree in systems analysis and integration from Huazhong University of Science and Technology in 2003. His current research interests include neural networks and stability analysis of dynamic systems. He developed a new region partition method, and characterized the attractive regions and locations of the attractors. Mathematically fundamental work was obtained to explain how many and where the exponentially stable attractors can emerge. The results he obtained

have also reinforced the methodologies of applying multistability theories to the description of many neurodynamic systems with associative memory phenomena. For now, he has authored or co-authored over 200 scientific papers published in leading journals. He was awarded the Outstanding Young Scholars by the National Natural Science Foundation of China, and the Yangtze River Distinguished Professorship by the Ministry of Education of China. He has been an Associate Editor of the IEEE Transactions on Neural Networks (2010–2011), IEEE Transactions on Cybernetics (since 2014), IEEE Transactions on Fuzzy Systems (since 2016), and a member of the Editorial Board of Neural Networks (since 2012), Cognitive Computation (since 2010), Applied Soft Computing (since 2013). He has been the General Chair, Program Committee Chair, Publications Chair, and Workshop and Special Sessions Chair for over 40 international conferences, such as the 19th International Conference on Neural Information Processing (ICONIP2012, the flagship annual conference of the Asia Pacific Neural Network Society), the 2014 IEEE World Congress on Computational Intelligence (IEEE WCCI 2014), the 2019 IEEE Symposium Series on Computational Intelligence (IEEE SSCI 2019, the flagship conference of IEEE Computational Intelligence Society).

Dongbin Zhao
Institute of Automation, Chinese Academy of Sciences, CHINA
for contributions to adaptive dynamic programming and reinforcement learning.



Dongbin Zhao is currently a Professor with the Institute of Automation, Chinese Academy of Sciences and also the University of Chinese Academy of Sciences, China. He received the B.S., M.S., Ph.D. degrees from Harbin Institute of Technology, Harbin, China, in 1994, 1996, and 2000 respectively. He was a postdoctoral fellow at Tsinghua University, Beijing, China, from 2000 to 2002. After then he joined the Institute of Automation, Chinese Academy of Sciences as an associate professor, now a Professor there. From 2007 to 2008, he was a visiting scholar at the University of Arizona, USA.

His current research interests are in the area of deep reinforcement learning, computational intelligence, autonomous driving, game artificial intelligence, robotics, smart grids, etc. He has published 6 books and over 80 international journal papers.

Dr. Zhao serves as the Associate Editor of IEEE Transactions on Neural Networks and Learning Systems, IEEE Transactions on Cybernetics, IEEE Computation Intelligence Magazine, etc. He is the chair of Distinguished Lecture

Program Subcommittee, and was the Chair of Technical Activities Strategic Planning Subcommittee (2019), the Chair of Beijing Chapter (2017–2018), Adaptive Dynamic Programming and Reinforcement Learning Technical Committee (2015–2016), Multimedia Subcommittee (2015–2016), and Newsletter Subcommittee (2013–2014) of IEEE Computational Intelligence Society (CIS). He worked as several guest editors of renowned international journals. He served as the General Co-Chair of IEEE Computational Intelligence for Financial Engineering and Economics 2019, the Program Chair/Co-Chair of IEEE International Joint Conference on Neural Networks 2019, IEEE Symposium on Adaptive Dynamic Programming and Reinforcement Learning from 2016 to 2019, International Conference on Neural Information Processing (ICONIP) 2017, and Tutorial Chair of ICONIP 2018, the Publicity Co-chair of IEEE World Congress on Computational Intelligence (WCCI) 2016, and Finance Co-chair of WCCI 2014, and the Poster Chair of IEEE Symposium Series on Computational Intelligence 2014, etc.

Dr. Zhao was the recipient of Outstanding Paper Award of IEEE Transactions on Cognitive and Developmental Systems in 2020, etc. His team won several international competition awards including IEEE ICRA Robomaster AI Challenge.



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other cognitive psychology-based approaches. The problem of data quality is at the crossroad of statistical methods, fuzzy knowledge-based representations and fusion methodologies present in Computational Intelligence as well as agent-based systems. Among

all the crucial problems in Artificial Intelligence, ethical and social implications are the most difficult to deal with because of their complexity, and all technical submissions to TAI proposing solutions to such problems will be welcomed.

The submission website is open at <http://mc.manuscriptcentral.com/tai-ieee>. All original papers on Artificial Intelligence can be submitted.

Long live the IEEE Transactions on Artificial Intelligence!

