in academic institution and industrial laboratories to industries, entrepreneurs and government agencies. It also allows companies to announce job opportunities for CIS members.

As the new VP MA, one of the main challenges that I will face will be to retain and increase our membership, for which I plan to place a particular emphasis in the high potential available at areas such as the Latin America and the Asia-Pacific regions in which there is a growing interest in computational intelligence. For this task, I will build upon the excellent work done by my predecessor, Dr. Pau-Choo (Julia) Chung, who has also been of great help to make this transition as smooth as possible.

I will also encourage a higher involvement of our members in CIS activities, with the aim of making them feel that they are part of a valuable Society that looks after its members, by supporting them, encouraging networking and helping them to develop their careers. I am convinced that the more they get involved, the more they will appreciate the value of their CIS membership, while contributing to the development of computational intelligence and the IEEE.

Clearly, the IEEE CIS has a lot of offer for those eager to get involved and I encourage all CIS members to get the maximum benefit from their membership. For more information about the CIS and to get involved in some of the many activities that we have for you, please feel free to contact me at: ccoello@cs.cinvestav.mx.

If you are not a member yet, please look at the many opportunities that you are missing and join CIS as soon as possible. I can assure you that it is worth doing it!

Marios M. Polycarpou
IEEE CIS 2018 Awards Committee Chair, University of Cyprus, CYPRUS

2019 IEEE CIS Awards

Neural Networks Pioneer Award
Yoshua Bengio
University of Montreal, CANADA
For fundamental contributions to neural network-based natural language processing.

Recognized as one of the world’s leading experts in artificial intelligence and a pioneer in deep learning, Yoshua Bengio studied in Montreal, earned his Ph.D. in computer science from McGill University in 1991, and did post-doctoral studies at MIT.

Since 1993, he has been a professor in the Department of Computer Science and Operations Research at the Université de Montréal, and he holds the Canada Research Chair in Statistical Learning Algorithms. In addition, he is the Scientific Director of IVADO and Mila, the Quebec Artificial Intelligence Institute, the world’s largest deep learning academic research group.

An Officer of the Order of Canada, he is also a Fellow of the Royal Society of Canada, the recipient of the Marie-Victorin Prize in 2017, and was named Radio-Canada’s Scientist of the Year for 2017. In 2018, he was awarded the 50th anniversary medal of Quebec’s Ministry of International Relations and Francophonie.

Yoshua Bengio is one of the world’s most cited computer scientists, thanks to his three books and more than 500 publications. His h-index stands at 129, with more than 142,000 Google Scholar citations. His ambition is to understand the principles that lead to intelligence through learning, as well as promote the development of artificial intelligence for the benefit of all.

Fuzzy Systems Pioneer Award
Hisao Ishibuchi
Southern University of Science and Technology (SUSTech), CHINA
For contributions to fuzzy rule-based classifier design.

Hisao Ishibuchi is currently a Chair Professor at the Department of Computer Science and Engineering, SUSTech, China. After completing his MS studies on precision mechanics in Kyoto University in 1987, he joined...
Prof. Hideo Tanaka’s research group as a Research Assistant, where he started his research on fuzzy systems. Since then, he had been with Osaka Prefecture University for 30 years.

In the early 1990s, he proposed a heuristic fuzzy rule generation method for pattern classification problems. Then he combined a genetic algorithm with the rule generation method to select a small number of fuzzy rules with high classification ability. He generalized this approach to multi-objective genetic rule selection in the 1990s, which was the first study on multi-objective genetic fuzzy systems. In the 2000s, he proposed multi-objective fuzzy genetics-based machine learning. He received a Best Paper Award from FUZZ-IEEE 2009, 2011 and GECCO 2004, 2017, 2018. He also received a JSPS Prize from Japan Society for the Promotion of Science in 2007. In 2018, he was selected in the “Recruitment Program of Global Experts for Foreign Experts” known as the “Thousand Talents Program” in China.

Evolutionary Computation Pioneer Award
Zbigniew Michalewicz
Complexica, AUSTRALIA
For contributions to the development of generalized evolutionary search heuristics.

Zbigniew Michalewicz received the Master of Science degree from the Technical University of Warsaw, Poland, in 1974; the Ph.D. degree from the Institute of Computer Science, Polish Academy of Sciences, in 1981, and the D.Sc. degree in Computer Science from the Polish Academy of Science in 1997. He is currently Emeritus Professor of Computer Science at the University of Adelaide, Australia. He is also a Professor with the Institute of Computer Science, Polish Academy of Sciences and the Polish-Japanese Institute of Information Technology, Warsaw. Zbigniew Michalewicz is the Chief Scientific Officer at Complexica (www.complexica.com), a leading provider of software applications that harness the power of Artificial Intelligence and big data to optimize sales, marketing, and supply chain decisions.

For many years his research interests were in the field of evolutionary computation. He published several books, including a monograph Genetic Algorithms + Data Structures = Evolution Programs (3 editions, a few translations, over 20,000 citations), and 300 technical papers in journals and conference proceedings that are cited widely (over 50,000 citations). Other books include Adaptive Business Intelligence and How to Solve It: Modern Heuristics (both published by Springer, Berlin, 2006 and 2004, respectively), Puzzle-based Learning (Hybrid Publishers, Melbourne, 2008), Winning Credibility: A Guide for Building a Business from Rags to Riches (Hybrid Publishers, Melbourne, 2007), where he described his business experiences over the last years.

Zbigniew Michalewicz was one of the three editors-in-chief of the Handbook of Evolutionary Computation and the general chairman of the First IEEE International Conference on Evolutionary Computation held in Orlando, June 1994. In April 2002 he received the title of Professor from the President of Poland, Mr. Alexander Kwasniewski. In December 2002 he acted as advisor of Lech Walesa, a former President of Poland and a Nobel Prize winner, when Lech Walesa was awarded honorary Ph.D. from the University of North Carolina at Charlotte, USA. In 2006 he was appointed a Business Ambassador for the State of South Australia. In December 2013, Zbigniew was awarded (by the President of Poland, Mr. Bronislaw Komorowski) the Order of the Rebirth of Polish Polandia Restituta—the second highest Polish state decoration civilian for outstanding achievements in the field of education, science, sports, culture, arts, economy, national defence, social activities, the civil service and the development of good relations with other countries.

Zbigniew has secured numerous multi-million dollar industry contracts from companies such as General Motors, Ford Motor Company, Bank of America, BHP Billiton, Rio Tinto, AirLiquide, BB&T, Dulux, and Dentsu, and his scientific and business achievements have been recognized by many invited talks and publications, including TIME Magazine, Newsweek, New York Times, Forbes, Business Journal, and the Associated Press among others.

Meritorious Service Award
Pablo Estévez
University of Chile, CHILE
For leadership, achievements and dedication to the IEEE Computational Intelligence Society, and the development of a strategic plan for the society’s future.

Pablo A. Estévez received his professional title in electrical engineering (EE) from Universidad de Chile, in 1981, and the M.Sc. and Dr.Eng. degrees from the University of Tokyo, Japan, in 1992 and 1995, respectively. He is a Full Professor with the Electrical Engineering Department, University of Chile, and former Chairman of the EE Department in the period 2006-2010.

Prof. Estévez is one of the founders of the Millennium Institute of Astrophysics (MAS), Chile, which was created in January 2014. He is currently leading the Astroinformatics/Astrostatistics group at MAS. He has been an Invited Researcher with the NTT Communication Science Laboratory, Kyoto, Japan; the Ecole Normale Supérieure, Lyon, France; and a Visiting Professor at the Pantheon-Sorbonne University, Paris, France, and the University of Tokyo, Tokyo, Japan.

Prof. Estévez is an IEEE Fellow. He served as President of the IEEE Computational Intelligence Society (CIS) for the term 2016-2017, President-elect (2015), Vice-president of Members Activities (2011-2014), CIS ADCOM Member-at-Large (2008-2010), CIS Distinguished Lecturer (2006-2011) and as an Associate Editor of the IEEE Transactions on Neural Networks (2007-2012). Prof. Estévez served as conference chair of the International Joint Conference on Neural Networks (IJCNN), held in July 2016, in Vancouver, Canada, and general co-chair of the 2018 IEEE World Congress on Computational Intelligence, IEEE WCCI 2018, held in Rio de Janeiro, Brazil, in July 2018.
His current research interests include big data, deep learning, neural networks, self-organizing maps, data visualization, feature selection, information theoretic-learning, time series analysis, and advanced signal and image processing. One of his main topics of research is the application of machine learning and computational intelligence techniques to frontier research in astrophysics and biomedical engineering.

**IEEE Transactions on Neural Networks and Learning Systems Outstanding Paper Award**

**IEEE Transactions on Fuzzy Systems Outstanding Paper Award**

**IEEE Transactions on Evolutionary Computation Outstanding Paper Award**

**IEEE Transactions on Cognitive and Developmental Systems Outstanding Paper Award**

**IEEE Computational Intelligence Magazine Outstanding Paper Award**

**Outstanding Chapter Award**
IEEE CIS San Diego Chapter, USA
*For increasing awareness in the broader San Diego technical community in computational intelligence as applied to numerous technical disciplines.*

**Outstanding PhD Dissertation Award**
Supervisor: Yaochu Jin
University of Surrey, UK.


**Abstract**—Large optimization problems that involve either a large number of decision variables or many objectives pose great challenges to nature inspired optimization algorithms. On one hand, nature inspired optimization algorithms suffer from the curse of dimensionality in the decision space. With an exponentially increased volume of the decision space as well as the complexity of the search landscape, it is challenging for nature inspired optimization algorithms to perform efficient search within limited execution time. On the other hand, nature inspired optimization algorithms can suffer from the curse of dimensionality in the objective space. In high-dimensional objective space, due to the sparse distribution of the candidate solutions, efficient population diversity management and convergence pressure preservation become particularly important. In this thesis, we present several pieces of work to address the above challenges. Firstly, we present two variants of the particle swarm optimization algorithm to tackle single-objective large problems. By enhancing the swarm diversity, the two algorithms are capable of handling problems with as large as 5000 decision variables. Secondly, we present an inverse model based evolutionary algorithm to tackle multi-objective large problems. By building inverse models that map candidate solutions from the objective space to the decision space, the algorithm is able to enhance the computational efficiency in the optimization of bi- or three-objective problems with a large number of decision variables. Thirdly, we present a reference vector guided evolutionary algorithm to tackle optimization problems with many objectives. By decomposing the high-dimensional objective space into subspaces using a set of reference vectors, the algorithm is able to handle problems with as many as 10 objectives. Finally, we present a benchmark test suite which can be used to assess the performance of nature inspired optimization algorithms on problems with both a large number of decision variables and many objectives. The performance of all proposed algorithms have been verified on widely used benchmark problems in comparison with some other state-of-the-art algorithms. Moreover, the proposed reference vector guided evolutionary algorithm has been successfully applied to the optimization of a seven-objective hybrid electric vehicle controller model designed at the Honda Research Institute Europe.

**Outstanding Early Career Award**
Erik Cambria
Nanyang Technological University, SINGAPORE

*For fundamental contributions to sentiment analysis research.*

Erik Cambria received his PhD in Computing Science and Mathematics in 2012 following the completion of an EPSRC project in collaboration with the MIT Media Lab, which was selected as impact case study by the University of Stirling for the UK Research Excellence Framework. After working at HP Labs India and Microsoft Research Asia, in 2014 he joined Nanyang Technological University as an assistant professor.

Dr Cambria is associate editor of several journals including IEEE Computational Intelligence Magazine and IEEE Intelligent Systems, where he manages the Department of Affective (continued on page 14)
The last topic addressed in this special issue is an application of fuzzy methods of aggregation to brain-computer interfaces, in a paper written by Li-Wei Ko, Yi-Chen Lu, Humberto Bustince, Yu-Cheng Chang, Yang Chang, Javier Fernandez, Yu-Kai Wang, Jose Antonio Sanz, Graçaliz Pereira Dimuro and Chin-Teng Lin. Besides its intrinsic interest, this paper can be regarded as an exemplar of the role that fuzzy methods play in the management of very complex systems.

The seven papers included in this issue exemplify some of the research trends based on Lotfi’s seminal work and illustrate the synergy between CI techniques and hybrid methods when dealing with most complex systems. Other fuzzy logic and soft computing trends have evolved over time in domains associated with web and numerical data management, internet security, information retrieval, data mining, data science, and robotics. The understandability of information and the interpretability of systems are key elements in modern environments. We believe that fuzzy systems will likely play a role in Explainable Artificial Intelligence (XAI), a new research trend aimed at making AI actions and decisions easily understood by humans.

Finally, we are sincerely thankful to all the authors who have contributed these papers. We hope that this collection of articles, beyond being a homage to Lotfi A. Zadeh’s seminal work, will also inspire CI researchers to consider fuzzy methods in solving their research problems and continue the evolution of soft computing and CI.

Reference

Society Briefs (continued from page 9)

Computing and Sentiment Analysis. He is founder of SenticNet, a spinoff offering B2B sentiment analysis services, and is recipient of many awards, e.g., the 2018 AI’s 10 to Watch award.

His main research focus is sentiment analysis, for which he proposed an approach that is both top-down and bottom-up: top-down for the fact that it leverages symbolic models such as semantic networks and conceptual dependency representations to encode meaning; bottom-up because he uses sub-symbolic methods such as deep neural networks and multiple kernel learning to infer syntactic patterns from data.

In general, he takes a holistic approach to sentiment analysis by handling many sub-problems involved in extracting meaning and polarity from text. While most works approach it as a simple categorization problem, in fact, sentiment analysis is actually a suitcase research problem that requires tackling many tasks. As Marvin Minsky would say, the expression ‘sentiment analysis’ itself is a big suitcase (like many others related to affective computing, e.g., emotion recognition or opinion mining) that all of us use to encapsulate our jumbled idea about how our minds convey emotions and opinions through natural language.

Dr Cambria addresses the composite nature of the problem via a three-layer structure that concomitantly handles tasks such as concept extraction, to deconstruct text into words and multilword expressions, subjectivity detection, to filter out neutral content, named-entity recognition, to locate and classify named entities into pre-defined categories, personality recognition, for distinguishing between different types of users, sarcasm detection, to detect and handle sarcastic expressions, aspect extraction, for enabling aspect-based sentiment analysis, and more.