## Special Issue on:

# Smart Fuzzy Optimization in Sustainable Manufacturing and Supply Chain Management

Over the last decades, Fuzzy optimization has demonstrated a variety of successful applications in diverse research areas that include *manufacturing systems*, *transportation planning*, *Supply Chain Management (SCM)*, *information technology*, *Operations Research (OR)*, *data science*, and *smart cities*, among others. **Smart fuzzy optimization** has soundly contributed to Research and Development (R&D) with the help of Artificial Intelligence (AI), Machine Learning (ML), Deep Learning (DL), analytics, and hybrid tools. **Smart fuzzy optimization** has unfolded novel horizons in thinking that will lead us into another half-century of progress. Fuzzy optimization is based on the approximation of *nonlinear optimization* approaches, which has fundamentally created some systematic but not unified theories of *fuzzy systems* as well as other methodologies dependent on various types of **fuzzy sets** (e.g., type-2 fuzzy set, fuzzy rough set, and neutrosophic set).

Furthermore, **fuzzy decision-making** is an interdisciplinary area that concentrates on methodologies that are able to translate useful experiences and knowledge into decision-making processes. It analyzes **qualitative** and **quantitative** factors or a hybrid structure with the help of fuzzy sets. Duly, a wide range of specific research topics have been developed and applications conducted based on **fuzzy decision-making**. These include hybrid fuzzy optimization based on hybrid evolutionary and swarm intelligence methods, fuzzy automaton-based human-robot interaction, data mining-based inferences and fuzzy-based rules, big data fuzzy analytics, and interpretability.

On one hand, the manufacturing and supply chain environment takes specific inputs, adds value, and transforms such inputs into products for end customers. Supply chains deal with manufacturing and distribution processes, including a large number of subsystems. On the other hand, the concept of **Sustainable Development Goals** (**SDGs**) reflects the undeniable fact that ecological considerations must be considered in supply chain activities. These considerations include the idea of creating an efficient and environmentally friendly production setting that leads to the development of all SDGs. The SDGs consist of issues that affect supply chain processes in the era of *Industry 4.0*. So one of the main contemporary questions is whether current *manufacturing systems* are sustainable and whether they efficiently use resources so these are not scarce and hence could be passed to future generations. Nowadays, the study and analysis of **Complex Systems** (**CSs**) with the help of fuzzy systems have reached a high level of efficiency in order to treat sustainable development problems in organizations based on *Industry 4.0* requirements. CSs comprise the Internet, financial markets, quality and reliability engineering, etc. Evidently, it is not easy to recognize and predict the behavior of CSs and also the impacts of any innovations in this field. This special issue, therefore, aims at encouraging and promoting the emergence of a new era of innovations, particularly focused on the application of **smart fuzzy**

**optimization** to achieve the SDGs within the context of global supply chains, their functional activities, and their operations.

This SI also aims at enabling a transparent, fair, and rapid communication of research that highlights the role of fuzzy decision-making and fuzzy optimization techniques to analyze the CSs in SCM across the SDGs. This SI emphasizes research focused on the theoretical, methodological, or practical applications of CSs in complex decision-making environments such as those posed by global supply chains. Additionally, this special issue seeks to clarify how advances in fuzzy systems can effectively contribute to the sustainable development of global supply chains.

Manuscript submissions are encouraged from a broad range of related topics, which may include but are not limited to the following research themes:

- Smart fuzzy optimization
- ML with fuzzy logic
- DL with fuzzy inference
- Fuzzy-based time series analysis
- Big data fuzzy analytics
- Fuzzy regime-switching models
- Neuro-fuzzy inference systems
- Fuzzy neural networks
- Fuzzy automata
- Nonlinear dynamics and chaos in complex fuzzy systems
- Systems dynamics in complex fuzzy systems
- Hybrid fuzzy systems

## Submission guidelines

All authors should read 'Information for Authors' before submitting a manuscript http://cis.ieee.org/ieee-transactions-on-fuzzy-systems.html.

Submissions should be through the IEEE TFS journal website http://mc.manuscriptcentral.com/tfs-ieee. It is essential that your manuscript is identified as a *Special Issue* contribution:

- Ensure you choose **'Special Issue'** when submitting.
- A cover letter must be included which includes the title '**Smart Fuzzy Optimization in Sustainable Manufacturing and Supply Chain Management**'

## Important dates

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| 1 November 2023 | Submission deadline | |
| January 2024 | Notification of the first round review | ) |
| April 2024 | Revised submission due | ) for guidance only |
| July 2024 | Final notice of acceptance/reject | ) |

## Guess Editors

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## Biographies



**Jose Arturo Garza-Reyes** is currently a Professor of Operations Management and Head of the Centre for Supply Chain Improvement, College of Business, Law and Social Sciences of the University of Derby, UK. Some other activities He is involved with, apart from my research duties include: supervision of Ph.D. and master research projects, teaching, and consultancy. He has published an extensive number of papers in highly regarded peer-reviewed Journals and International Conferences, as well as seven books in the areas of operations and innovation management, quality management systems, manufacturing performance measurement systems, and continuous improvement. His main research interests are in the area of Operations and Production Management,

Supply Chain and Logistics Management, Lean and Agile Operations and Supply Chains, Sustainability within the context of Operations and Supply Chains, Circular or Closed-Loop Operations and Supply Chains, Sustainable and Green Manufacturing, Industry 4.0 technologies application in operations and supply chains, Lean Management, Quality Management & Operations Excellence, Innovation Management. Currently, His research interest on business and process excellence methods has been refocused to incorporate and explore how these can enable more sustainable, greener and circular supply chains and internal business operations through the implementation of Industry 4.0 technologies. He is also an active reviewer of more than 30 journals.

**Eren Özceylan** is currently an Associate Professor of Industrial Engineering Department, Gaziantep University, Turkey. He received his Bachelor and Master Degrees in Industrial Engineering from Selçuk University in 2007 and 2010, respectively. Then, he received a Ph.D. degree in Computer Engineering from Selçuk University in 2013. Prior to his current job, he worked as a Postdoctoral Fellow at Northeastern University in 2019. He is the recipient of the Science Academy Young Scientists Award (BAGEP) in 2016 and Highly Cited Researcher Award from the Gaziantep University in 2017. His research mainly focuses on the application of mathematical optimization techniques to sustainable transportation, supply chain and logistics management problems, more specifically to location-allocation and disassembly line balancing problems. Dr. Özceylan has published over 60 peer-reviewed publications in prestigious academic journals including Transportation Research Part D and E, the Journal of the Operational Research Society, International Journal of Production Research, International Journal of Production Economics, Computers and Industrial Engineering and among others.

**Alireza Goli is** currently an assistant professor of the Department of Industrial Engineering and Future Studies Faculty of Engineering at the University of Isfahan, Iran. He received his Bachelor and Master Degree in Industrial Engineering from Golpayegan University of Technology (Iran, 2013) and Isfahan University of Technology (Iran, 2015), respectively. Then, he received a Ph.D. degree in Industrial Engineering from Yazd University (Iran, 2019). Recently, he has been featured among the "World's Top 2% Researchers/Scientists in 2021" list identified by Elsevier BV, Stanford University. He has published more than 60 papers in high-quality journals and conferences and has been serving as a reviewer in many reputed journals such as IEEE Transactions on Fuzzy System, Journal of Supercomputing, and Annals of Operations Research. He has been serving on the guest editorial board in several journals such as Annals of Operations Research (Springer) and Environmental Science and Pollution Research (Springer). In addition, He has been serving as a reviewer in many reputed journals such as Supercomputing, IEEE Transactions on Fuzzy System, and expert system with application. He is working as a member of the editorial board in different journals like Mathematical Problems in Engineering and Journal of Applied Research on Industrial Engineering. His current research interests include supply chain management, disaster relief optimization, meta-heuristic algorithms, robust optimization, artificial intelligence, and portfolio management.

**Erfan Babaee Tirkolaee** obtained a BSc. (2012) and MSc. (2014) in Industrial Engineering from Isfahan University of Technology in Isfahan, Iran. Then, he received a Ph.D. degree (2019) in Industrial Engineering from Mazandaran University of Science and Technology in Babol, Iran. Dr. Erfan Babaee Tirkolaee is currently an assistant professor in the Department of Industrial Engineering at Istinye University in Istanbul, Turkey. Meanwhile, he worked as a Quality Assurance consultant and Training manager in some automotive industries in Iran, and could go through different relevant courses like ISO 9001: 2015 and IATF 16949-2016. He has been verified as a scientific elite by the Young Researchers and Elite Club in 2017 and Iran's National Elites Foundation in 2018. He has published more than 80 papers in high-quality journals, including IEEE Transactions on Fuzzy Systems, Expert Systems with Applications, Waste Management, Journal of Cleaner Production, Computers & Industrial Engineering, Annals of Operations Research, etc. His eleven papers have been selected as ESI Highly Cited Papers. He has been serving as a chair/organizing&committe member/keynote speaker in several prestigious international conferences, and as a reviewer in many reputed WoS journals such that he has been recognized as a Top Peer Reviewer in 2 of the Essential Science Indicators research areas by Clarivate WoS. Dr. Erfan Babaee Tirkolaee is currently an Associate Editor of Expert Systems with Application (Elsevier) and an Editorial Advisory Board member of Management Decision (Emerald). Moreover, he has been serving on the guest editorial board in several journals such as Annals of Operations Research (Springer) and Environmental Science and Pollution Research (Springer). Recently, he has been featured among the "World's Top 2% Researchers/Scientists in 2021" list identified by Elsevier BV, Stanford University.

His research fields include Waste Management, Supply Chain Management, Solution Algorithms, Industrial Engineering, Operations Research, Fuzzy Programming, Robust Optimization.

**Huchang Liao** (M'13–SM'17) is a Research Fellow at the Business School, Sichuan University, Chengdu, China. He received his PhD degree in Management Science and Engineering from the Shanghai Jiao Tong University, Shanghai, China, in 2015. He has published 4 monographs, and more than 320 peer-reviewed papers, many in high-quality international journals including *Decision Analysis*, *European Journal of Operational Research*, *Omega, IEEE Transactions on Fuzzy Systems, IEEE Transactions on Engineering Management, IEEE Transactions on Systems, Man, and Cybernetics: Systems*, *IEEE Transaction on Cybernetics,* etc. His publications have been cited over 15,500 times, and his h-index is 69. He has been a Highly Cited Researcher in Computer Science (2019-2022), and a Highly Cited Chinese Researchers in Management Science (2020-2021). He ranked within the top 2% Ranking of Scientists in the World by Stanford University (2020-2022). His main research interests include multiple criteria decision analysis, group decision analysis, fuzzy decision analysis, mechine learning based decision analysis and medical decision analysis.

Prof. Liao has been elected to be the Fellow of IET (The Institution of Engineering and Technology), the Fellow of BCS (British Computer Society), the Fellow of RSA (Royal Society of Arts), and the Fellow of IAAM (International Association of Advanced Materials). He is the Area Editor of *International Journal of Information Technology & Decision Making* (SCI), Associate Editor, Guest Editor or Editorial Board Member for many top-tier international journals, including *IEEE Transactions on Fuzzy Systems* (SCI), *Information Fusion* (SCI), *Applied Soft Computing* (SCI), *Omega* (SSCI/SCI), *Technological and Economic Development of Economy* (SSCI), *International Journal of Strategic Property Management* (SSCI), *Engineering Applications of Artificial Intelligence* (SCI), *International Journal of Fuzzy Systems* (SCI) and *Journal of Intelligent and Fuzzy Systems* (SCI). He has received numerous honors and awards, including the Outstanding Scientific Research Achievement Award in Higher Institutions in China (First

class in Natural Science in 2017; Second class in Natural Science in 2019), the Social Science Outstanding Achievement Award in Sichuan Province (Second Class in 2019), the Natural Science Research Achievement Award in Sichuan Province (Third class, in 2021), and the 2015 Endeavour Research Fellowship award granted by the Australia Government.