

June 2023

Proceedings of the International Conference on Industrial Engineering and Operations Management  
ISSN / E-ISSN: 2169-8767  
ISBN: 979-8-3507-0546-1

# **8th North American Conference on Industrial Engineering and Operations Management**

(Houston, Texas, USA, June 12-15, 2023)

Venue: Hilton University of Houston Hotel

Host: Texas A&M Engineering Experiment Station Institute of Manufacturing Systems (TEES-IMS) in collaboration with University of Houston – Hybrid)

**Editor-in-Chief**  
**Md Mizanur Rahman, Ph.D.**

## **Editorial Board:**

Dr. Adnan Hassan, Universiti Teknologi Malaysia  
Dr. Cherrafi Anass, ENSAM- Meknes, Moulay Ismail University, Morocco  
Taher Azar Ahmad, Benha University, Egypt  
Alimohammad AHMADVAND, University of Eyvanekey, Iran  
Michel ALDANONDO, Ecole des Mine d'Albi, France  
Bandar A. Alkhayyal, Prince Sultan University, Saudi Arabia  
Ahmad Taher AZAR, Benha University, Egypt  
Armand BABOLI, INSA Lyon, France  
Trishit BANDYOPADHYAY, Xavier School of Management, India  
Andrés Felipe BARCO, Universidad de San Buenaventura-Cali, Colombia  
Samuel BASSETTO, Ecole Polytechnique, Canada  
Mahdi BASTAN, University of Eyvanekey, Iran  
Philipp BAUMANN, University of Bern, Switzerland  
Cedrick BELER, Institut National Polytechnique de Toulouse – Ecole Nationale d'Ingénieurs de Tarbes, France  
Eric BONJOUR, ENSGSI – University of Lorraine, France

Robert BOUTE, KU Leuven, Belgium  
Xavier BRUSSET, SKEMA Business School, France  
Patricia Alcantara CARDOSO, Universidade Federal do Espírito Santo, Brazil  
Kah Hin CHAI, National University of Singapore, Singapore  
Aurélie CHARLES, University of Lyon France, France  
Elyn Solano CHARRIS, Universidad de La Sabana, Columbia  
Anis CHELBI, University of Tunis, Tunisia  
Aidin Delgoshaei, Industrial Engineering Department, Kharazmi University, Tehran, Iran  
Christine DI MARTINELLI, IESEG School of Management, France  
Jose Arturo Garza-Reyes, The University of Derby, UK  
Hamed Shakouri GANJAVI, University of Tehran, Iran  
Laurent ENESTE, Institut National Polytechnique de Toulouse – Ecole Nationale d’Ingénieurs de Tarbes, France  
Ali GHARBI, ETS Montreal, Canada  
Bernard GRABOT, Institut National Polytechnique de Toulouse – Ecole Nationale d’Ingénieurs de Tarbes, France  
Elise GRUHIER, University of Bordeaux France, France  
Bhaskar GARDAS, Veermata Jijabai Technological Institute, India  
Vastag GYULA, Széchenyi István University, Hungary  
Marc Haddad, Lebanese American University, Lebanon  
Khaled HADJ HAMMOU, Institut National des Sciences Appliquées de Lyon, France  
Ramzi HAMMAMI, ESC Rennes School of Business, France  
Alaa HASSAN, University of Lorraine, France  
Petri HELO, University of Vaasa, Finland  
Lazhar HOMRI, Arts et Métiers ParisTech, France  
Lars HVAM, Technical University of Denmark, Denmark  
Emmanuel HYON, Sorbonne Université – LIP6, France  
Peter JACOBSEN, Technical University of Denmark, Denmark  
Daouda KAMISSOKO, IMT Mines Albi, France  
Özge Karanfil, Koç Üniversitesi, Turkey  
Laoucine KERBACHE, HEC Paris, France  
Javad KHAMISABADI, Islamic Azad University, Iran  
Reza Ramazani KHORSHID-DOUST, Amirkabir University of Technology, Iran  
Nathalie KLEMENT, Arts et Métiers ParisTech, France  
Anil Kumar, University of Derby, UK  
Arun KUMAR, RMIT University, Australia  
Vikas KUMAR, University of the West England, UK  
Elmar KUTSCH, Cranfield University, UK  
Samir LAMOURI, ENSAM Arts et Métiers ParisTech, France  
Carman LEE, Hong Kong Polytechnic University, Hong Kong  
Danping LIN, Shanghai Maritime University, China  
Chrity Yaqiong LV, Wuhan University of Technology, China  
Lahcen MIFDAL, Universiapolis Agadir, Morocco  
Mehrdad MOHAMMADI, IMT Atlantique, France  
Seyed Meysam MOUSAVI, Shahed University, Iran  
Simon Peter Nadeem, University of Derby, UK  
Balkrishna NARKHEDE, National Institute of Industrial Engineering, India  
Banu OZKESER, KOLUMAN Industry Automotive, Turkey

Maurice PILLET, Université de Savoie Mont Blanc, France  
Rakesh RAUT, National Institute of Industrial Engineering, India  
Nidhal REGZ, University of Lorraine, France  
Luis Rocha-Lona, Instituto Politecnico Nacional, Mexico  
Turki SADOK, University of Lorraine, France  
Jérémie SCHUTZ, University of Lorraine, France  
Sara SHAFIEE, Technical University of Denmark, Denmark  
Shakouri G. Hamed, University of Tehran, Iran  
Dellagi SOFIENE, University of Lorraine, France  
Reza TAVAKKOLI-MOGHADDAM, University of Tehran, Iran  
Ayeley TCHANGANI, Institut National Polytechnique de Toulouse – Ecole Nationale d’Ingénieurs de Tarbes, France  
Norbert TRAUTMANN, University of Bern, Switzerland  
Jiri TUPA, University of West Bohemia, Czech Republic  
Yazgı TÜTÜNCÜ, Izmir University of Economics, Turkey  
Eric VILLENEUVE, Ecole Supérieure des Technologies Industrielles Avancées, France  
Junqiang WANG, Northwestern Polytechnic University, China  
Yue WANG, Hang Seng Management College, Hong Kong  
Yong WU, Griffith University, Australia  
Christoph WUNCK, Jade University of Applied Sciences, Germany  
Esma YAHIA, Arts et Métiers ParisTech, France  
Bingwen YAN, Cape Peninsula University of Technology, South Africa  
Marc ZOLGHADRI, Ecole des Ingénieurs en Mécanique de Paris, France  
Funlade Sunmola, University of Hertfordshire, Hatfield, UK  
Ali MOSTAFAEIPOUR, Industrial Engineering Department, Yazd University, Iran

International Conference of Industrial Engineering and Operations Management (ICIEOM) aims to publish quality research work in the field of industrial engineering and operations management (IEOM) for academics, researchers and practitioners to advance the theory and practice as well as to identify major trends in industrial engineering and operations management. The journal is expected to advance the theory and practice through publishing research-oriented papers with a wide variety of problems related on real-life applications and research which affect in global levels.

ICIEOM covers academic research and industrial issues/applications related on fundamentals of industrial engineering, operations management, business management, operations, design, manufacturing, supply chain management, logistics, systems and service engineering, innovation, entrepreneurship, reliability, quality, lean, six sigma, modeling, simulation, optimization, sustainability, machine learning, and artificial intelligence. The application areas include manufacturing, healthcare, energy, transportation, financial, and business operations. Articles must have scientific research contribution with state-of-the-art review.

Published by IEOM Society International, 21411 Civic Center Dr., Suite # 205, Southfield, Michigan 48076, Phone 1-248-450-5660, Email: [info@ieomsociety.org](mailto:info@ieomsociety.org)

Open access proceedings are available online at <http://ieomsociety.org/ieom/proceedings/>

**Production Director**

Md Taufiqul Islam, Ph.D.

**Cover Illustration**

Takiyah Ali