# IFAC MIM 2019-Invited Session on Energy-Efficient Modeling and Optimization for Production Scheduling

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**CALL FOR PAPERS**

**Chairs:**
Prof. Dr. **M. Fatih Tasgetiren**, Yasar University, Turkey/HUST, China
Prof. Dr. **Deniz Türsel Eliiyi**, Yasar University, Turkey
Prof. Dr. **Liang Gao**, Huazhong University of Science and Technology (HUST), China
Prof. Dr. **Quan-Ke Pan**, Shanghai University, China

## Abstract

Recently, green manufacturing considering energy consumption has gained attention due to the scarce energy resources and a series of environmental effects. The rising amount of greenhouse gas emissions ($CO_2$), which is caused by fossil fuel consumption, initiates environmental pollution and global warming. As the energy is commonly generated through fossil fuels, effective usage of energy will provide a considerable reduction on carbon dioxide emissions, and slow down the rapid exhaustion of fuel resources. Since manufacturing companies are responsible for the high energy consumption and the related carbon emissions, they are faced with a pressure to reduce their energy consumption. Therefore, manufacturing enterprises have made attempts to develop energy efficient approaches to reduce their energy consumption and carbon emissions. One main approach for minimizing the energy consumption in manufacturing systems is to obtain energy-efficient machines. However, significant financial investment is needed for this approach and it is not practicable for most of the manufacturing sector, particularly for small-sized companies.

This session aims to addresses the trade-off between total energy consumption (TEC) and traditional production efficiency measures such as makespan, total flowtime, tardiness etc. Hence, it emphasizes the energy-efficient shop floor scheduling by evolving the classical engineering approach into a resource-efficient design of production scheduling systems.

## Scope and Topics

This session aims to put forward original contributions, latest research and development, and contemporary issues in the field of computational intelligence for energy-efficient production scheduling systems. It intends to collect a series of innovative, high quality papers on ideas, concepts, and technologies that make use of metaheuristic algorithms in these research areas. Proposed submissions should be original, unpublished, and present novel fundamental research contributions from a theoretical or an application point of view. Session topics include (but are not limited to) the following:

## Problems

- Energy-efficient modeling and optimization of single machine scheduling
- Energy-efficient modeling and optimization of parallel machine scheduling
- Energy-efficient modeling and optimization of permutation flowshop scheduling
- Energy-efficient modeling and optimization of no-wait flowshop scheduling
- Energy-efficient modeling and optimization of no-idle flowshop scheduling

- Energy-efficient modeling and optimization of blocking flowshop scheduling
- Energy-efficient modeling and optimization of hybrid flowshop scheduling
- Energy-efficient modeling and optimization of hybrid no-wait flowshop scheduling
- Energy-efficient modeling and optimization of hybrid no-idle flowshop scheduling
- Energy-efficient modeling and optimization of hybrid blocking flowshop scheduling
- Energy-efficient modeling and optimization of distributed flowshop scheduling
- Energy-efficient modeling and optimization of distributed no-wait flowshop scheduling
- Energy-efficient modeling and optimization of distributed no-idle flowshop scheduling
- Energy-efficient modeling and optimization of distributed blocking flowshop scheduling
- Job shop variants and hybrid variants of distributed shop floors above

## Methods

- Mathematical modeling and programming (MIP, MILP, Constraint Programming)
- Evolutionary computation (Evolution strategy, genetic algorithms, differential evolution etc.)
- Swarm intelligence (Particle swarm optimization, artificial bee colony algorithm etc.)
- Metaheuristics
    - Simulated annealing
    - Tabu search
    - Iterated greedy algorithms
    - Iterated local search algorithms
    - Variable neighborhood search
    - Block insertion heuristics
    - Ensemble methods

## Important dates:

- Submission Deadline:                    December 15, 2018
- Decision Notification:                   February 20, 2019
- Final Paper Submission:                  March, 15, 2019

## Paper Submission:

For author guidelines, please refer to www.ifac-control.org. All papers must be submitted electronically using Symposium Manuscript Management System (CMMS). All papers must be prepared in a two-column format in accordance with the IFAC manuscript style. Please use the official IFAC instructions and template to prepare your contribution as full-length draft paper and submit it online by December 15, 2018. Submission details are available on the symposium website. All submissions must be written in English. All papers that conform to submission guidelines will be peer-reviewed by IPC members. The corresponding author submits the paper online (pdf format) as an invited session paper. Submission as an invited paper requires the invited session code XXX.

**Publication:** Several international journals are associated with the IFAC MIM 2019 for publication of special issues.

## Technical Program Committee:

- **M. Fatih Tasgetiren**, Industrial Engineering Department, Yasar University, Turkey
- **Deniz Türsel Eliiyi**, Industrial Engineering Department, Yasar University, Turkey
- **Liang Gao**, Department of Industrial and Manufacturing System Engineering, Huazhong University of Science and Technology, China

- **Quan-Ke Pan**, School of Mechatronic Engineering and Automation, Shanghai University, China
- **Weiming Shen**, National Research Council, Canada
- **Rubén Ruiz**, Grupo de Sistemas de Optimización Aplicada, Instituto Tecnológico de Informática, Universitat Politècnica de València, Spain
- **P. N. Suganthan,** Nanyang Technological University, Singapore
- **Swagatam Das**, Indian Statistical Institute, India
- **Yun-Chia Liang**, Industrial Engineering Department, Yuan-Ze University, Taiwan
- **Ceyda Oguz,** Industrial Engineering Department, Koc University, Turkey
- **Meral Azizoğlu,** Industrial Engineering Department, METU, Turkey
- **Raymond Chiong**, School of Design, and Information Technology, The University of Newcastle, Australia
- **Mario C. Vélez-Gallego**, Departamento de Ingeniería de Producción, Universidad EAFIT, Colombia
- **Adil Baykasoğlu**, Industrial Engineering Department, Dokuz Eylül University, Turkey
- **Arslan Ornek**, Industrial Engineering Department, Yasar University, Turkey.
- **Şeyda Topaloğlu,** Industrial Engineering Department, Dokuz Eylül University, Turkey
- **Xinyu Li**, Department of Industrial and Manufacturing System Engineering, Huazhong University of Science and Technology, China
- **Jun-Qiang Wang**, Department of Industrial Engineering, Northwestern Polytechnical University, China.
- **Jie Zhang**, College of Mechanical Engineering, Donghua University, China
- **Qiuhua Tang**, Department of Industrial and Manufacturing Engineering, Wuhan University of Science and Technology, China
- **Jun-Qing Li**, School of Computer Science, Liaocheng University, China
- **Hong-Yan, Sang**, School of Computer Science, Liaocheng University, China
- **Yu-Yan, Han**, School of Computer Science, Liaocheng University, China
- **Kai Zhou Gao**, Institute of Systems Engineering, Macau University of Science and Technology, Macau
- **Congbo Li,** School of Computer Science, Chongqing University, China
- **Rui Wang,** College of System Engineering, National University of Defense Technology, China
- **Li-Ning Xing,** College of System Engineering, National University of Defense Technology, China
- **Ugur Eliiyi**, Computer Science Department, Dokuz Eylul University, Turkey
- **Damla Kizilay**, Industrial Engineering Department, Yasar University, Turkey
- **Hande Oztop**, Industrial Engineering Department, Yasar University, Turkey
- **Sel Ozcan**, Industrial Engineering Department, Yasar University, Turkey
- **Damla Yüksel,** Industrial Engineering Department, Yasar University, Turkey