# The 12th International Symposium on Operations Research and its Applications

# in engineering, technology and management (ISORA 2015)

Luoyang, China, August 21-24, 2015

Edited by Xiang-Sun Zhang Degang Liu Ling-Yun Wu Yong Wang



©2015 IET

# 2015 The 12th International Symposium on Operations Research and its Applications in engineering, technology and management (ISORA)

Copyright ©2015 by the Institution of Engineering and Technology. All rights reserved.

## EISBN 978-1-78561-086-8



## **ABOUT ISORA 2015**

#### THEME AND SCOPE

The 12th International Symposium on Operations Research and its Applications in engineering, technology and management (ISORA 2015), organized by Asia-Pacific Operations Research Center (APORC) under APORS and the Chinese Academy of Sciences (CAS), will be held in Luoyang, center of Chinese ascent civilization from August 21-24, 2015.

ISORA is a series international symposium with goals to provide an international forum for scientists, researchers, educators, and practitioners in OR/MS to exchange ideas and approaches, to present research findings and state-of-the-art solutions, to share experiences on potentials and limits, and to open new avenues of research and developments, on all issues and topics related to the theories and applications of Operations Research. The previous 11 ISORAs under the support of CAS and National Science Foundation of China (NSFC) were successful and attracted many international scholars.

The themes of ISORA 2015 focused on "OR Applications in solving our today's problems". We are particularly interested in submissions that report on experimental and applied research motivated by practical social and industrial problems. Theoretical and applied papers are expected to show convincingly the usefulness and efficiency of models, algorithms, and decision supporting tools discussed in a practical setting. Typical, but not exclusive, topics of interest are:

- Optimization Theory and Applications
- Deterministic and Stochastic Models
- Supply Chain and Logistics Management
- Telecommunication Networks
- Emergency and Disaster Management
- Industrial Engineering
- Reliability
- Complex Systems
- OR Methods in Biotechnology
- Biomedical Engineering
- Health Care Models
- OR Applications in Engineering, Technology and Management
- Other OR Modeling and Solution Techniques

#### COMMITTEES

- General Chairs
  - Xiang-Sun Zhang (Chinese Academy of Sciences, China)
  - Masanori Fushimi (Nanzan University, Japan)
- Program Committee
  - Tatsuo Oyama (Co-Chair) (National Graduate Institute for Policy Studies, Japan)
  - Shu-Cherng Fang (Co-Chair) (North Carolina State University, USA)
  - Xiuli Chao (University of Michigan, USA)
  - Masanori Fushimi (Nanzan University, Japan)
  - Toshihide Ibaraki (Kwansei Gakuin University, Japan)
  - Richard C. Larson (Massachusetts Institute of Technology, USA)
  - Sung Joo Park (Korea Advanced Institute of Science and Technology, Korea)
  - Naihua Xiu (Beijing Jiaotong University, China)
  - Yaxiang Yuan (Chinese Academy of Sciences, China)
  - Wuyi Yue (Konan University, Japan)
  - Hanqin Zhang (Chinese Academy of Sciences, China)
  - Xiang-Sun Zhang (Chinese Academy of Sciences, China)
  - Yuzhong Zhang (Qufu Normal University, China)
- Organizing Committee
  - Degang Liu (Chair) (Chinese Academy of Sciences, China)
  - Ling-Yun Wu (Chinese Academy of Sciences, China)
  - Yong Wang (Chinese Academy of Sciences, China)
  - Youlin Shang (Henan University of Science and Technology, China)

#### PROCEEDING PAPERS AND CONTRIBUTING AUTHORS

Thirty-four full papers in this volume cover wide range of operations research and its applications in engineering, technology and management. Authors of these papers come from China mainland, Hong Kong, Japan, Malaysia, Poland, Qatar, and United States of America. Many active researchers in various areas contributed their overview and introduction in their fields besides specific deep research achievements.