# **Preface**

This journal volume contains the accepted papers from the Third International Conference on Applied Mechanics, Materials and Manufacturing (ICAMMM 2013), held in Dalian, China, August 24-25, 2013. The scientific discipline behind this conference was theoretical and applied mechanics and its applications in materials and manufacturing fields. ICAMMM is concerned with the study of mechanical phenomena: the behavior of solids and fluids under the actions of forces. It has an enormous influence on the industrialized world, enabling technological developments in virtually every area that affects our lives, security, and well being. The aim of this conference was to put together individuals, institutes and countries, interested in cooperative actions for further development.

We would like to extend a warm welcome to all the authors and participants of this 3rd ICAMMM. We hope that this conference will be useful to the research and development in the field and all of you will have a wonderful experience with this fruitful conference, and at the same time enjoy the sights of Dalian in China.

### The editors

# The Third International Conference on Applied Mechanics, Materials and Manufacturing (ICAMMM 2013)

## Organized by:

Dalian polytechnic university

Liaoning Key Laboratory of Clean Textile

Liaoning Engineering Technology Research Center of Clean Textile

## **Conference Organization**

## **General Chairman**

Prof. Laijiu Zheng, Dalian Polytechnic University, China

Prof. Shin-ichi Skuroda, Gunma University, Japan

Prof. Huawu Liu, Tianjin Polytechnic University, China

# **Technical and Organizing Committee**

Prof. Weixing Chen, Xi'an Technological University, China

Prof. Jiwei Cai, Hebei United University, China

Prof. Wenbo Du, Beijing University of Technology, China

Prof. Huili Ding, Hebei University of Technology, China

Prof. Xianjin Yu, Shandong University of Technology, China

Prof. Ming Dong, Shanghai Jiao Tong University, China

Prof. Xiaoxing Feng, Hebei University of Technology, China

Prof. Wenzhi Fu, Jilin University, China

Prof. Zhengping Fang, Zhejiang University, China

Prof. Jian Gao, Guangdong University of Technology, China

Prof. Jing Guo, Dalian Polytechnic University, China

Prof. Kai Gu, Beijing Institute of Petrochemical Technology

Prof. Yin Biao Guo, Xiamen University, China

Prof. Zhaohui Huang, China University of Geosciences, China

Prof. Junjie Hao, University of Science & Technology Beijing, China

Prof. Julong He, Yanshan University, China

Prof. Xingang Hou, Lanzhou Uinversity of Technology, China

Prof. Jingtao Han, University of Science & Technology Beijing, China

Prof. Lin He, Guizhou University, China

Prof. Xiaoming Jia, Hebei United University, China

Prof. Xiaolin Jia, Zhengzhou University, China

Prof. Zhenglian Jiang, Research Institute, Baosteel, China

Prof. Sihai Jiao, Research Institute, Baosteel, China

Prof. Shanqing Li, Research Institute, Baosteel, China

Prof. Xianghua Liu, Northeastern University, China

Prof. Jiacheng Liu, Tianjing University, China

Prof. Kaiqi Liu, Iron&Steel Reserch Institute, China

Prof. Yaqing Liu, North University of China

Prof. Jialu Li, Tianjin University of Technology, China

Prof. Yungang Li, Hebei United University, China

Prof. Dehong Lu, Kunming University of Science and Technology

Prof. Changsheng Li, Northeastern University, China

Prof. Baochun Lu, Nanjing University of Science and Technology

Prof. Chenxu Lu, Insti. of Process Eng., Chinese Academy of Science

Prof. Yongcheng Lin, Central South University, China

Prof. Gaifei Peng, Beijing Jiaotong University, China

Prof. Dianli Qu, University of Science and Technology Liaoning

Prof. Junan Shen, Georgia Southern University, USA

Prof. Wenlei Sun, Xinjiang University, China

Prof. Junyou Shi, Qingdao University of Science&Technology, China

Prof. Zhiming Shi, Inner Mongolia University of Technology, China

Prof. Yi Shen, Hebei United University, China

Prof. Xiaoming San, Hebei United University, China

Prof. Xitang Wang, Wuhan University of Science and Technology

Prof. Jun Wang, Northeastern University, China

Prof. Qiang Wang, University of Jinan, China

Prof. Pengcheng Wang, Inner Mongolia University of Technology, China

Prof. Mingzhi Wang, Yanshan University, China

Prof. Ming Wen, Hebei University of Technology, China

Prof. Kaiming Wu, Wuhan University of Science and Technology

Prof. Guoqing Xiao, xi'an University of Architecture and Technology

Prof. Peiyu Yan, Tsinghua University, China

Prof. Xiaoyan Yuan, Tianjin University, China

Prof. Shao Hui Yin, Hunan University, China

Prof. Rong Zhu, University of Science & Technology Beijing, China

Prof. Daoyuan Yang, Zhengzhou University, China

Prof. Zepeng Zhang, China University of Geosciences, China

Prof. Chun Liang Zhang, Guangzhou University, China

Prof. Jianmin Zeng, Guangxi University, China

Prof. Ping Zou, Northeastern University, China

Prof. Shihong Zhang, The Institute of Metal Research, CAS

Prof. Changsheng Zhao, Sichuan University, China

Prof. AKM Nurul Amin, International Islamic University, Malaysia

Prof. Carlos Caceres, The University of Queensland, Australia

Dr. Chunsheng Lu, Curtin University of Technology, Australia

Dr. Dongbin Wei, University of Wollongong, Australia

Prof. Geun Jo Han, Dong-A Univeristy, Korea

Dr. Gui Wang, The University of Queensland, Australia

Prof. Jong Kook Lee, Chosun University, Korea

Prof. Ken-ichi Manabe, Tokyo Metropolitan University, Japan

Prof. Jeng-Haur Horng, National Formosa University, Taiwan

Prof. Jia-Horng Lin, Feng Chia University, Taiwan

Prof. Indra Putra Almanar, Universiti Sains Malaysia

Prof. Kyung-Man Moon, Korea Maritime University, Korea

Dr. Mark Fong, Hong Kong Industrial Technology Research Centre

Prof. P. S. Pa, National Taipei University of Education, Taiwan

Prof. Sagar Kamarthi, Northeastern University, USA

Prof. Shahrum Abdullah, University Kebangsaan Malaysia, Malaysia

Prof. Toshio Haga, Osaka Institute of Technology, Japan

Prof. Walid Mahmoud Shewakh, Beni Suef university, Egypt

Prof. Yun-Hae Kim, Korea Maritime University, Korea

Dr. Yuantong Gu, Queensland University of Technology,

Prof. Yu-Shiang Wu, China University of Sci. and Tech., Taiwan

Prof. Heinz-Gunter, Brokmeier, Technische Universitat Clausthal, Germany

Prof. Zhengyi Jiang, University of Wollongong, Australia

Prof. Yun-Hae Kim, Korea Maritime University, Korea

Prof. Christian Kloc, Nanyang Technological University, Singapore

Prof. Jacques Noudem, CRISMAT laboratory, France

## **Local Organizing Committee**

## Chair

Prof. Laijiu Zheng, Dalian Polytechnic University

#### **Members**

Prof. Shin-ichi Skuroda, Gunma University, Japan

Prof. Jihui Wang, Dalian Polytechnic University, China

Prof. Yanping Peng, Dalian Polytechnic University, China

Prof. Yuezhen Bin, Dalian University of Technology, China

Prof. Andong Li, Shenyang University of Chemical Technology, China

Prof. Yongzhu Cui, Dalian Polytechnic University, China

Dr. Bing Du, Dalian Polytechnic University, China