
Preface

Recent rapid globalisation of manufacturing industries leads to a drive and thirst for rapid advancements in technological development and expertise in the fields of advanced design and manufacturing, especially at their interfaces. This development results in many economical benefits to and improvement of quality of life for many people all over the world. Technically speaking, this rapid development also create many opportunities and challenges for both industrialists and academics, as the design requirements and constraints have completely changed in this global design and manufacture environment. Consequently the way to design, manufacture and realise products have changed as well. The days of designing for a local market and using local suppliers in manufacturing have gone, if enterprises aim to maintain their competitiveness and global expansion leading to further success. In this global context and scenario, both industry and the academia have an urgent need to equip themselves with the latest knowledge, technology and methods developed for engineering design and manufacture.

To address this shift in engineering design and manufacture, supported by the European Commission under the Asia Link Programme with a project title FASTAHEAD (A Framework Approach to Strengthening Asian Higher Education in Advanced Design and Manufacture), three key project partners, namely the University of Strathclyde of the United Kingdom, Northwestern Polytechnical University of China, and the Troyes University of Technology of France organised a third international conference. This conference aims to provide a forum for leading researchers, industrialists and other relevant stakeholders to exchange and debate their research results as well as research issue. This conference focuses on papers describing the cutting edge research topics, fundamental research issues related to the global advanced design and manufacture and recent industrial application papers with a goal towards bringing together design and manufacture practitioners from academics, government organisations, and industry from all over the world. The conference aims to cover the recent advancement and trends in the area of design and manufacturing and to facilitate knowledge sharing, presentations, interactions, discussions on emerging trends and new challenges in design and manufacturing fields. The particular focus of this conference is on the understanding of the impact of distributed team based design and manufacture on research and industrial practices for global companies. Being the third conference in this theme since 2004, the aims of the conference are: (a) to become a regular major forum for the international scientific exchange on multi-disciplinary and

inter-organisational aspects of advanced engineering design and manufacturing engineering; and (b) to provide opportunities in presenting and formalising the methods and means for industrial companies to design and manufacture successful products in a globally distributed team based environment.

It is well known that engineering design activities are mostly undertaken in the developed countries, represented by European, American and Japanese companies, whereas more manufacturing activities are undertaken by more companies that are located in Asian. This trend may start to change as some engineering design work is gradually outsourced in Asian companies as well. This increasing geographical distribution of tasks involved in the whole product realisation process brings great challenge as well as huge benefits for all stakeholders. It is therefore timely to organise this international conference and bring together leading researchers, academics and industrialists to discuss these issues and promote the future research in these important areas.

Out of 385 full papers submitted, the organisers use the review results from international reviewers, and finally selected 174 papers for publication. Based on the topics of the paper submitted, editors have divided them into relevant chapters and produced two books. This book is the first one and contains a selection of refereed papers presented at the third conference. It represents the latest thinking on engineering design and manufacture from mainly Europe and Asia perspectives. It includes 85 papers from 174 accepted refereed papers, focusing on the advancement in the area of advanced design and integrated design and manufacture area. This book is therefore a reflection of the key papers presented in all areas related to the advanced design, its technologies, and interface to manufacturing engineering.

More specifically, the book covers the following seven broad topics in engineering design and each of these has been called chapter:

Chapter 1: Front End of Engineering Design

Conceptual design including shape design and synthesis, engineering guidelines from practical points of view, functional representation, customers' requirement capture and so forth becomes even important in the context of global design and some of the selected papers just address their importance and research findings for global design.

Chapter 2: Engineering Knowledge Management and Design for X

In an era of knowledge economy, capture of engineering design and manufacture knowledge, representation and their management become very important research and practical issues. Knowledge engineering support in various stages of the product realisation process is vital to the success of any enterprises. A large selection of papers have been devoted to this topic.

Chapter 3: Detail Design and Design Analysis

Even at the time innovation and new product development becomes the main battle ground for competition, rigorous, reliable and new methods to support the detail design is still important. This has also been identified as an important research topic group from the papers submitted.

Chapter 4: Simulation and Optimisation in Design

Recent rapid development in computational power of desktop computers made advanced analysis software tools for product simulation and optimisation available even for small to medium sized companies as well as for educational users. This has resulted huge change in the way engineers conduct their engineering design and manufacture business. Sixteen papers have devoted their focus on the use of these technologies.

Chapter 5: New Mechanism and Device Design and Analysis

Eight papers have been selected to describe some new design and analysis of these devices. It is aimed to show the new Materials sciences focusing on functional ceramic material design and their manufacture; manufacturing systems design, simulation of their manufacturing systems and their optimisation.

Chapter 6: Manufacturing Systems Design

Design of manufacturing systems has traditionally been considered to be part of manufacturing discipline. Through the papers selected, it is clear that they form integral part of the product realisation process and hence they should be considered at the engineering design process.

Chapter 7: Collaborative and Creative Product Development and Manufacture

Following the previous chapter, this chapter deals with the collaborative issues of the advanced design and manufacture. Editors deliberately compiled this chapter to be the last chapter to reflect its link to Chapter 6. More importantly, it is appropriate to use this chapter to draw a conclusion to the book on global advanced design.

The editors of the book:

Xiu-Tian Yan, Benoit Eynard and William J Ion

Global Design to Gain a Competitive Edge
An Holistic and Collaborative Design Approach based
on Computational Tools

Yan, X.-T.; Eynard, B.; Ion, W.J. (Eds.)

2008, XIX, 888 p., Hardcover

ISBN: 978-1-84800-238-8