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Collaborative Product Design and Manufacturing Methodologies and Applications

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Collaborative Product Design and Manufacturing Methodologies and Applications

Springer

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Preface

During the past few decades, there have been major innovation and paradigm shifts in product development methodologies and strategies. The current R&D trend is towards the development of collaborative design and manufacturing systems. The research theme is in line with the growing demand for global cooperative design and outsourcing in product development to gain better competitive advantage. Using the collaborative systems, designers and manufacturers can participate in global design chains and collaborate with partners locally and overseas to pursue competitive advantages. Furthermore, collaborative systems allow designers to work closely with suppliers, manufacturing partners and customers across enterprises' firewalls to obtain valuable inputs for their design and manufacturing activities.

From the early 1990s, some major R&D works have been reported, including the CyberCut system by the University of California at Berkeley; the FIPER (Federated Intelligent Product EnviRonment) system (FIPER Project, www.fiperproject.com/fiperindex.htm) funded by NIST; the Web-DPR system by the Georgia Institute of Technology), *etc*. Commercial systems include SolidWorks eDrawing™, Autodesk Streamline™, Impactxoft IX Design™, Onespace™, SmarTeam™, PTC ProjectLink™ and Windchill™, UGS TeamCentre™, *etc*. However, the developed strategies, methodologies and solutions still fall short of the expectation of the practical needs. They have not been generally accepted due to the weaknesses and limitations in collaboration management, interactive capabilities, security of data, real-time and ease of collaboration, *etc*. Different culture, educational background, or design habit of people also make it difficult to organize optimal collaborative design and outsourcing activities. To address the issues and make collaborative engineering more realistic and applicable, more efforts are being made.

The aim of this book is to update the relevant and recent research and development in this field. In this book, thirteen original and innovative chapters have been included to address the major challenges of developing collaborative design and manufacturing systems and techniques, with scientific and rigorous foundations as well as application values. The covered topics include: collaborative methodologies and strategies between humans, and between systems and humans

to facilitate collaborative design and manufacture; cooperation across domains for multi-disciplinary design and manufacture; distributed system and service architectures for collaborative design and manufacture; interoperability of collaborative systems; new feature- and assembly-based methodologies for facilitating collaborative design and manufacture; workflow and conflict resolution/management in collaborative design and manufacture; design process and design change management in collaborative development, *etc.*

This book can be used as reference for mechanical/manufacturing/computer engineering graduate students and researchers in the fields of concurrent engineering and collaborative engineering for the efficient utilization, deployment and development of collaborative product design and manufacturing.

During the development of this book, we have received invaluable input and support from the chapter authors. We are also grateful to the editors of Springer-Verlag for their patience and professionalism during the editing process.

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