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## Introduction

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**Biographical notes:** Dr Rong is the Higgins Professor of Mechanical Engineering and the Director of Computer-Aided Manufacturing Laboratory (CAM Laboratory) at Worcester Polytechnic Institute (WPI). He worked as a faculty member at Southern Illinois University at Carbondale for eight years before joining WPI in 1998. His research on computer-aided fixture design (CAFD) has been well recognised. He is the principal investigator of many research projects funded by federal agencies and manufacturing companies.

Shaw C. Feng works in the Manufacturing Systems Integration Division of the Manufacturing Engineering Laboratory at the National Institute of Standards and Technology. He has six years' experience in developing CAD, CAM, and automated inspection software for computer integrated design and manufacturing. Dr Feng has published numerous reports and papers in the areas of design and process planning integration, manufacturing execution, concurrent engineering, process planning, solid/ surface modeling, automated manufacturing systems, geometric tolerancing, inspection planning, and inspection data analysis.

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In recent years, manufacturing has been increasingly flexible, agile, productive and cost effective to enable manufacturers to be more competitive. One of the reasons for this achievement is that many significant improvements in manufacturing have been achieved on the systems level. For example, integrated product design and development with improved manufacturing process capability plays an important role in reducing the product development cycle time with ensured quality and low cost. The application of computer modelling, simulation, and optimisation techniques is also a contributive factor. The flexibility, agility, and productivity can be further enhanced by optimised production lead-time and costs. Supply chain management and e-business are also critical factors in manufacturing nowadays. As expected, new challenges in the current environment of mass customisation and supplier-based manufacturing have emerged.

This special issue includes papers that provide information on the state-of-the-art research in modelling and optimisation of supplier-based manufacturing management, specifically, in the following areas. In supply chain management, dynamic behaviours in

a value chain in production and services are studied and mathematically modelled for value chain optimisation. In addition, intelligent planning and control in supply chain management can, therefore, be performed. A methodology for supplier evaluation and selection in a supplier-based manufacturing environment has been studied and proposed. In the manufacturing planning and execution integration area, a survey on setup planning reveals the latest methodology in workpiece fixturing and robust machining, and a novel function block technique is described for the integration of process planning and scheduling with manufacturing execution control. Finally, software agents are applied for enabling systems coalition for manufacturing process planning and supply chain management integration.