Preface

Engineering design and manufacturing today face a number of challenges across the global product supply chains both in industrialised nations and in the emerging economies. In order to remain sustainable or grow, most industry sectors are trying to increase profitability and quality, and meet the diverse requirements of a wide range of stakeholders involved in the global supply chains. As a consequence of this, there is an increased investment in research and innovation leading to novel engineering products and manufacturing technologies based on new design paradigms and engineering processes that utilise advanced materials.

This book focuses on particular advances in engineering materials, product and systems design. The research contributions selected for this book stem from an international virtual engineering forum involving researchers and research organisations from Europe and Australia. All contributions have been invited and peer reviewed by an international panel of experts. The book includes three main sections: (i) advances in engineering design; (ii) advances in engineering materials and manufacturing; and (iii) engineering applications. In most cases, the research efforts reported in this book result from collaborative research involving research organisations and industry.

The section on advances in engineering design covers a range of research topics that feature novel computational design tools and optimisation methods that support the development of contemporary engineering products and systems. These include select biomimetic and bioengineering design techniques, computational tools for stress-strain analysis and optimisation of non-traditional high performance engineering structures, and others. The section covering the advances in engineering materials and manufacturing provides a comprehensive selection of research studies involving nanotechnologies and nanoscale material characterisation, design and development of novel materials for advanced machining and additive manufacturing (such as sintered laser melting and fused deposition processes). Featured engineering applications include aerospace and automotive engineering components and systems, bioengineering and sports applications.

This research monograph aims to inform research and development in select areas by providing insight into particular engineering advances through applied research studies and practical examples. I wish to thank all authors and reviewers for their efforts and contributions without which this publication would not be possible.

Professor Dr Aleksandar Subic

Editor