

Preface

The laser has made tremendous changes by providing solutions to the many challenges faced by the manufacturing sector. It has given new dimensions to non-traditional manufacturing due to its ability to process hard and brittle materials, focus beams in the range of sub-millimetre, less heat affected zone (HAZ) generation, easy transport and accessibility of the beam to the work-piece and non-contact processing. The laser is compatible with various processes including forming, joining, cutting, additive manufacturing (AM) and surface treatment of almost all kinds of materials including metals, ceramics, polymers and composites.

Laser material processing has been attracting the attention of researchers since the mid-1970s because of its broad applications potential in industry. Application of lasers is increasing in industries not only for material processing but also for sensing in proximity switches, bar code readers, vibration detectors and distance meters. Industry 4.0 cannot be imagined without lasers due to its breadth of materials processing, flexibility, possibility of full automation and remote operation, fast processing; and the dispensing of tools, dies and fixtures. Processing with laser beams has proved itself suitable for rapid prototyping (RP), customized production, maintenance and repair and production in space. Although some challenges such as low efficiency, slow processing of some materials, high set-up costs and damage to the workpiece need to be addressed to make the process even more acceptable to certain manufacturing industries. A large number of researchers are working across the globe to address these issues.

We are glad to present this special issue of *Lasers in Engineering* from selected papers presented in the 7th International & 9th Conference on Advancements and Futuristic Trends in Mechanical and Materials Engineering (AFTMME 2019) held at the Indian Institute of Technology Ropar, India in association with the Society of Materials and Mechanical Engineers from the 5-7 December 2019. The nine peer-reviewed papers presented herein are submitted by reputed academicians and researchers which cover a range of topics in laser material processing including forming, cutting, cladding,

alloying, AM and machining. These papers cover experimental, numerical, analytical, optimization and soft-computing analysis.

It is a great feeling to edit this special issue of *Lasers in Engineering* because the first time the papers from AFTMME have been compiled in such way as to form a journal special issue. We greatly appreciate the support from the Organising Committee, Sessions Chairs and volunteers for their sincere efforts to organize AFTMME. Many people have contributed directly to this special issue, including authors and reviewers and we sincerely acknowledge their time and effort.

The papers contained herein represent original developments in laser materials processing and serve to motivate the reader to consider further research questions in this direction. We wish this special issue of *Lasers in Engineering* to be successful, popular and useful to the engineers, scientists and researchers in the fields of laser materials processing, materials science and advanced manufacturing technology. We are sure that this special issue will provide valuable information to the readers.

Dr Ravi Kant
Indian Institute of Technology Ropar, India