

Preface

The World of Photonics congress in Munich is a world-class event addressing the actual progress of photonics technologies with respect to many different aspects. The use of lasers in production technologies is addressed by the LiM conference. Compared to the situation a few years ago, the role of lasers in manufacturing becomes twofold: One is the continued extension of the influence of lasers by enabling new processes and applications. The second is the laser as an established tool in industrial processes, where high power lasers are no more an exotic experiment but just a commodity. Despite the fact that the laser-based processes are well accepted and adapted in industrial daily life, there are still significant efforts ongoing to enhance precision, reliability and effectivity. In the first mentioned category of processes there still has to be fundamental research and development to implement new ideas also in production. As an example new materials like press hardened steel have to be joined and laser technology brings a very important prerequisite of low line energy in brazing and welding. In tool making, new materials, especially surface coatings and structures for extreme mechanical and tribological loads and high number of process cycles are needed to realize dry metal forming. Dry metal forming omits lubricants to protect the environment, but the stress on the forming tools increases. Process developments for such applications long for new high-power lasers such as ultrafast lasers with pulse widths of some ps at average powers exceeding 1 kW. Using those and other new developments, new processes can be worked out. The 3D printing of metallic components is another example for a process, which is rapidly gaining of importance in industrial use. Additive manufacturing of organic materials, e.g. for applications in medical and biological fields, is the next area which is coming up.

The WLT – Wissenschaftliche Gesellschaft Lasertechnik – is the German association of scientists who are leading the larger institutes working on laser technology in Germany. The association promotes collaboration between the scientists linked to the WLT and their institutes, foster education in summer schools and classes, proposes and develops new research programs together with the politics, and last but not least organizes the LiM.

The LiM – International Conference on Lasers in Manufacturing – is the platform for discussing scientific and application oriented contributions from research and development in universities, institutes and industry. It brings together young scientists, experienced researchers and people from industry. The mutual exchange opens chances for the application of new ideas to solve actual problems and gives impulses for new research work. In more than 250 contributions – the largest number since the launch of the LiM conference series in 2001 – from 22 countries all over the world actual results will be presented and discussed.

Such a conference cannot run without the help of a large number of unresting helping hands. We therefore like to express our gratitude to all members of the Organizing Committee and the Scientific Committee for their valuable support of the preparation of the LiM. Special thanks for the organization of the conference reception is due to our colleague Prof. Michael Zaeh.

We hope that the conference venue, the reception, the proceedings and especially the contents meet your demands and are helpful for your further work in research, development or application of laser technology!

Munich, June 2019

On behalf of the WLT: The Chairmen of LiM 2019

Prof. Uwe Reisgen – Prof. Michael Schmidt – Prof. Michael Zaeh – Prof. Michael Rethmeier