

## **Talk title: “Laser Micro Processing for Surface Engineering and Structuring”**

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### **Abstract**

Laser micro processing (LMP) is a promising manufacturing solution for fabricating complex micro-engineering products in wide range of materials that incorporate different multi-scale surface structures and/or textures. Commercial LMP systems are available and there are constant advances both in “component” technologies, e.g. laser sources and beam delivery sub-systems, and also in application areas enabled by them. State-of-art LMP platforms offer capabilities for processing relatively large freeform surfaces selectively with high dynamics, repeatability, reproducibility and operability with other complementary processing steps. The talk will outline recently developed generic tools and processing technologies for LMP applications. Their capabilities will be demonstrated in producing micro-scale functional structures/features of high-value products, i.e. the manufacture of waveguides for THz devices and ceramic interface cards, and in engineering surfaces with functional micro and sub-micron topographies for a range of optical, microfluidic, microbiological, non-fouling and replication applications. In addition, recently developed inspection and process monitoring tools for minimising LMP uncertainties will be discussed, especially for identifying/detecting shifts and changes in the LMP conditions and hence in features/structures/textures’ functionalities.

### **Short bio**

**Stefan Dimov**, Dipl. Eng., PhD, DSc, FIMechE, is Professor of Micro Manufacturing and Head of Advanced Manufacturing Technology Centre at Department of Mechanical Engineering, the University of Birmingham. He obtained his Diploma Engineer and Doctoral degrees from Moscow State University of Technology and Doctor of Science degree from Cardiff University. His research interests encompass the broad area of advanced manufacturing with a special focus on Micro and Nano Manufacturing, Additive Manufacturing and Hybrid Manufacturing technologies. He established the Micro Manufacturing and Hybrid Manufacturing labs in Birmingham, which are now widely recognised for their internationally leading research. His academic output includes more than 250 technical papers and 13 books. He has supervised over 25 PhD theses to completion. He has won in excess of £30M in external research grants and contracts. He is Associate Editor of the ASME Journal of Micro- and Nano-Manufacturing and Precision Engineering Journals. In addition to pursuing and leading research, he has also been very active with knowledge transfer to industry, applying the results of his work to help multinational companies and SMEs to create wealth and safeguard jobs. He has established the Multi-Material Micro Manufacture (4M) Community in 2004 through the FP6 4M NoE programme and currently he is Executive Officer of the self-sustained 4M Association ( [www.4m-association.org](http://www.4m-association.org) ). He is the recipient of Thomas Stephens Group Prize in 2000 and 2003 and

Joseph Whitworth Prize in 2017 awarded by the Institution of Mechanical Engineers (IMechE).